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A
Military
Encyclopedia

BASED ON OPERATIONS IN THE
ITALIAN CAMPAIGNS
1943 - 1945

HEADQUARTERS 15 ARMY GROUP ITALY

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ENCYCLOPEDIA

BASED ON OPERATIONS IN
THE ITALIAN CAMPAIGNS
1943 - 1945

PREPARED BY G - 3 SECTION
HEADQUARTERS 15 ARMY GROUP ITALY

CONTENTS

iii

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

xi

CONTENTS

CONTENTS

CONTENTS

xiv

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

FOREWORD

Military operations in Italy were influenced to an almost inestimable degree by the natural mountainous characteristics of the country. In general, its topography, climate, road-net, the construction of its buildings, and the location of its villages favored the defense and confronted any attacking force with a series of obstacles, formidable in themselves and, in combination, well nigh insurmountable.

To meet these conditions, new techniques had to be developed, and variations of standard tactical doctrine devised. The improvizations and adaptations used throughout the campaign to meet the varied situations presented led to the development of many new procedures, methods, and expedients.

Early in the campaign the value of compiling the knowledge gained by experience in operations was fully appreciated. Many notes and comments were recorded in various memoranda, reports, records, and publications at various times by various headquarters. Many items, however, had never been recorded. It was felt that the compilation of such materiel, illustrating the practical application of the doctrines and methods contained in our manuals and texts under the conditions met in Italy, would be of great benefit in the immediate future and particularly in the post-war period. It was also realized that the completeness and accuracy of the contents of such a compilation depended in large measure upon the collection of pertinent data while experiences were still fresh in the minds of those contributing information and experiences.

This encyclopedia has been compiled by 15th Army Group with the foregoing in mind. The chapters on all matters not of

FOREWORD

an administrative nature present the combined experience of both the U.S. Fifth and the British Eighth Armies. The solutions to the problems encountered were those deemed best fitted to meet the conditions which confronted our troops in Italy. Some of the procedures and methods developed would have been impracticable or unsuitable in other theaters. Controversial matters were also resolved in the light of the existing situation, and the conclusions reached obviously cannot be considered as conclusive for the Army as a whole. Final decision on such matters must be based on the experiences of our armies in all theaters.

Mark W Clark

THE TERRAIN OF ITALY

In order that this compilation of procedures, techniques, and expedients may be studied in its proper perspective, the following brief summary of the major characteristics of the Italian peninsula is presented.

a. Terrain

The terrain of Italy is generally mountainous. The broad flat valleys of the principal rivers, the Po and the Arno, and the narrow coastal plain are in contrast to the rugged Apennines. The mountain slopes were steep and sometimes rocky, cut into irregular patterns by twisting valleys and deep gorges. Transverse rivers cut the mountains into a succession of ridges that gave the defender a succession of strong natural positions. All the land in the valleys and on all but the steepest mountain slopes had been under cultivation for centuries and the soil, after prolonged periods of rain, became bottomless mud. Most mountain slopes were terraced and covered with vineyards, fruit trees, or olive groves.

b. Climate and Weather

Climate and weather naturally influenced operations to a marked degree. Prolonged periods of rain developed mud that restricted vehicular movement to the hard surfaced roads, while severe cold in the high mountains had the effect of slowing up both combat and supply operations.

c. Villages and Houses

Villages and houses were scattered in indiscriminate profusion all over Italy except in the highest mountains. They were located most commonly in the valleys but many were on mountain slopes and some crowned the heights of reasonably tall mountains. All buildings were of stone or brick construction, with thick walls that were invulnerable to all fire except direct hits by artillery. They afforded excellent commanding positions when located on dominant terrain.

d. Road Net and Communication Routes

The road net was limited and restricted. The metalled road system consisted of a few main routes usually widely separated and joined by poorly constructed and frequently impassable secondary roads, which were usually narrow, and in mountainous regions cut into the steep slopes. Numerous gorges and streams necessitated extensive bridging of the highway routes, and single or multiple span stone bridges punctuated all highways at frequent intervals. In the mountains, gradients were steep and dangerous. The narrow twisting mountain trails made vehicular movement hazardous at all times and particularly so during winter when mud, snow, and ice covered them. The majority of mountain trails could accommodate only a single file of troops or pack animals. Maneuver through terrain of this sort was slow and difficult. Frequently it was limited to small unit operations along a large front.

e. Demolitions

The systematic and extensive demolition operations of the enemy aggravated the problems presented by the already limited road net. Practically every bridge on the routes of withdrawal, and nearly all bridges on lateral roads were thoroughly demolished. Sections of mountain roads were blown out, and when main highways funnelled through narrow streets in villages and towns, buildings were blown to obstruct the roads with piles of rubble. Extensive engineer operations were necessary throughout the campaign to permit wheeled and tracked vehicles to support the advance.

ABBREVIATIONS

AFHQ	—	Allied Force Headquarters
ALO	—	Air Liaison Officer
AMG	—	Allied Military Government
Arty/R	—	Artillery Reconnaissance (Air)
ASC	—	Air Support Control
ASP	—	Ammunition Supply Point
BDA	—	Bomb Damage Assessment
BSL	—	Bomb Safety Line
CIC	—	Counter Intelligence Corps
CLN	—	Committee of National Liberation
CSDIC	—	Combined Service Detailed Interrogation Center
DOP	—	Detachment of Patients
EEIST	—	Enemy Equipment Intelligence Service Teams
FPN	—	Field Post Number
FSS	—	Field Security Service
GSI (b)	—	British Counter Intelligence Branch
GSI (CL)	—	British Intelligence (Civil Liaison)
IOSS	—	Intelligence Objectives Subsection
ISUM	—	Intelligence Summary
ISLD	—	Intelligence Service Liaison Department
JICA	—	Joint Intelligence Collection Agency
LCI	—	Landing Craft Infantry
LCM	—	Landing Craft Medium
LCT	—	Landing Craft Tank
LWB	—	Long Wheel Base
MAAF	—	Mediterranean Allied Air Force
M & D	—	Mail and Distribution

ABBREVIATIONS

MIA	—	Missing in Action
MSR	—	Main Supply Route
NOIC	—	Naval Officer in Charge
OB	—	Order of Battle
OSS	—	Office of Strategic Services
PRU	—	Photo Reconnaissance Unit
PWB	—	Psychological Warfare Board
RAC	—	Royal Armored Corps
RCT	—	Regimental Combat Team
RE	—	Royal Engineers
R/T	—	Radio Telephone
SAE	—	Supply, Administration and Evacuation
Tac/R	—	Tactical Reconnaissance (Air)
TCP	—	Traffic Control Post
VD	—	Venereal Disease
VHF	—	Very High Frequency

Chapter One

PERSONNEL

PERSONNEL

1. Infantry Replacements

The need for maintaining combat units constantly at T/O strength by the early replacement of casualties became apparent early in the campaign. Initially routine methods of replacement, involving the dropping of casualties from unit rolls, the requisitioning of replacements, and the filling of such requisitions from replacement sources some distance in rear of the divisions required a period of at least four or five days.

Studies to determine practical methods of shortening this period were linked with plans to provide the infantry divisions with advance allotments of replacements to be trained with and assimilated into units prior to their employment as replacements for combat casualties. Experience in late 1943 and the early months of 1944 wherein a shortage of infantry replacements occurred, crystalized opinion.

Before the attack on the Gustav Line in May, 1944, each division was given an overstrength of 750 infantrymen. This overstrength was broken down by the divisions and an overstrength of 250 allotted to each infantry regiment. The 250 was further apportioned by the regiments to each rifle and heavy weapons company. During the defense phases these men received battle indoctrination and training with front line units. Prior to the start of offensive operations, surpluses allotted to the companies were withdrawn, generally to a training area in the vicinity of the regimental Service Co. bivouac area, and their training continued. In the case of one division, surpluses were withdrawn to a division replacement unit located in the division rear area, and there retained under division control. As casualties occurred, these men were forwarded as replacements to the units with which they had trained. The 750 overstrength for the divisions was maintained by replacements from the rear.

For the purpose of maintaining combat units at T/O strength in officer personnel approximately 50 company grade infantry officers were furnished each infantry division as an advance on replacements to be absorbed by attrition. These officers were assimilated into the units in the same manner as was the enlisted surplus. It was the consensus of division commanders that this number was not sufficient for infantry, and that the number should be further augmented by the inclusion of Field Artillery and Engineer officers in the overstrength allowed.

The above plan proved to be a practical solution to the problem of immediate replacement of battle losses, and contributed largely to the success of the attack on the Gustav Line and all operations thereafter.

2. Armored Replacements

Whenever possible, armored units including the armored division, tank battalions, and tank destroyer battalions were authorized advance replacements. These replacements were organized as complete crews. Surplus tanks and tank destroyers were likewise authorized, and these crews and the equipment were immediately available as replacements for casualties. In most instances the loss of a tank did not entail the loss of the entire crew. However, the practice of feeding one or two replacements into a crew in action to replace casualties was found to reduce the efficiency of the crew and to be wasteful of manpower eventually.

Advance replacements were held in areas in the division rear, and were trained together as crews. Whenever a crew in action suffered casualties which caused it to become non-effective, it was withdrawn with its vehicle to the rear and a new crew and vehicle sent in as replacements. Casualties were replaced in the old crew which was then reorganized and trained as a unit to be used as a replacement crew when needed.

This system enabled armored units to sustain their maximum strength over prolonged periods of combat.

4

3. Assignment and Reassignment of Officers

The assignment and reassignment of officers presented a problem that became increasingly difficult as the campaign progressed. During the early period of the organization of the Fifth Army and of the Base sections in the Mediterranean area, vacancies existed for officers of all degrees of capability and of varied training and experience. It was not difficult at that time to place an officer in a position which was suited to his individual abilities. However, as time progressed, organizational vacancies in the army were filled, and at the same time the base sections reached a point where it was no longer easy to absorb officers found to be unsuited by temperament or experience to serve in a particular assignment. The higher the grade of the officer in question the more pronounced the problem became. Under the most favorable circumstances, which involved only the mutual exchange of an officer relieved from duty in the forward areas with an officer in rear areas, a delay of considerable duration was occasioned by the necessity of training and orienting each officer in his new duties.

The procurement of suitable battalion commanders presented major difficulties. It was usually found necessary to request officers from the United States for such assignments. These officers were handicapped during the period of their indoctrination by lack of battle experience, and in consequence did not receive the complete confidence of their men. After a successful action this lack of confidence disappeared. In cases where the new battalion commander was unable to perform properly the duties required of him after a reasonable trial, reassignment or reclassification was indicated. If officers could have been made available, a practical and favored solution would have been to allow each division and separate battalion an overstrength in field officers.

Initially, in an effort to avoid the detailed procedures and delays of reclassification procedures, commanding officers were authorized to transfer officers found unsatisfactory in their

current assignment but deemed suitable for assignment else-where. An officer in that category was sent successively to each higher command for the purpose of reassignment. If not sooner reassigned, he eventually reached a replacement pool. Here he was required to appear before a Board of Hearing which determined his proper disposition. Frequently the board found that reclassification proceedings were the proper solution and referred the case back to the unit concerned for their initiation. This was found to be a cumbersome and unsatisfactory method involving prolonged delays, and it was abandoned. The operation of the reclassification system under revised Army Regulations proved satisfactory.

At the time of the landings in North Africa, Task Force commanders were given authority to make combat appointments and promotions. Subsequently this authority was granted to succeeding commanders, and resulted in securing many junior officers of excellent caliber with battle experience and proven leadership and ability.

4. Rotation - Temporary Duty in U.S.

The return of military personnel to the United States was based on War Department policies and on directives issued by the Theater Commander. These policies and directives contemplated the return of the most deserving personnel, either on rotation (in which event they would not return to the same theater), or on temporary duty with return to the same unit prescribed. They directed that selection of personnel be based on length of overseas service, length of time in combat, decorations received, and wounds sustained. The number of persons to be rotated from the army was controlled by a quota established monthly by the theater commander.

Various methods of selection were given exhaustive study and trial. In order to arrive at a fair basis of selection and to spread the selection of rotation personnel as equitably as possible throughout all units of the army, a mathematical method of selection was worked out. Each unit was asked

to recommend each month up to one and one half per cent of its assigned strength for rotation. This total was about twice the number that could be expected to fall within the quota. As recommendations were received at army headquarters each individual was given a numerical rating by a point system. Each month of service overseas counted one point, each decoration for meritorious service one point, possession of the Combat Infantry Badge two points, membership in a Distinguished Unit two points, a wound four points. Holders of the Distinguished Service Cross were given high priority and their selection was usually automatic. Selections to fill the balance of the army quota were apportioned among the units of the army in proportion to the strengths of units. Individuals having the highest numerical rating in each unit were selected.

The return of personnel to the United States on temporary duty for periods up to forty-five days was accomplished without the restriction of a quota. Unit commanders determined the number of individuals that could be spared, and selections were made by the army on the basis of available shipping space. Individuals returned to the United States on temporary duty were normally away from their units for a period of at least four months. In unusual cases, involving key personnel, air travel was authorized to shorten this period.

The replacement of personnel rotated to the United States was a continuing problem. It was not found practicable or expedient to retain personnel selected for rotation until their replacements had arrived from the United States. Under authority of the theater commander, individuals selected received orders and departed with a minimum of delay. Initially, directives required that requisitions for rotation replacements be made direct to Theater Headquarters. This procedure often entailed prolonged delay in the receipt of replacements. Subsequent directives changed this procedure, and Army was authorized to requisition rotation replacements from the army replacement depot, if not available elsewhere within the army. The depot filled that part of the requisition for which suitable personnel were available in the depot, and forwarded the

balance of the requisition to the Replacement Command where the balance was filled if possible from its depots. That portion of the requisition still unfilled was forwarded by the Replacement Command to Theater Headquarters, which filled it by reassignment, or, if suitable personnel were not available, by requisition on the United States. If, after a period of six months, the rotation vacancy still existed the army commander was authorized to fill it by promotion.

In the majority of cases the replacements received were not of the same value to the unit as the individuals they replaced. Many enlisted replacements were overgraded for the duties they were expected to perform in combat. Frequently non-commissioned officers had received their ratings while assigned in different branches or on jobs where the requirements were entirely different. These men required additional training and orientation before they could properly perform the duties of their grade in their new assignments. Officer replacements lacked battle experience. In consequence it took some time for them to become as skilful or capable as the officers they replaced. In the case of battalion commanders the problem was particularly acute. In numerous cases a junior officer commanded the battalion over a prolonged period of time between the departure of the battalion commander on rotation and the arrival of his replacement. Inasmuch as the junior had in most cases battle experience lacked by the new commander, the morale of the unit was usually adversely affected during the period of readjustment.

Some undesirable results of temporary duty in the United States were noted among returned individuals. The physical benefits in most cases were marked, but in some cases there was a let-down in morale and in mental attitude which required a period of reorientation before the soldier again reached his former state of efficiency.

5. Army Detachment of Patients

A Detachment of Patients (DOP), composed of two officers and sixteen enlisted men, was established by Army to

8

administer and account for personnel during periods of hospitalization in Army hospitals.

The DOP received a daily Admission and Hospitalization Report (WD AGO Form R5013) from each Army hospital. On this notification that a soldier had been admitted to an Army hospital, the DOP picked him up as attached unassigned to the DOP, effective the date of admission to the hospital. The soldier's organization was immediately notified by the DOP to drop him from its organizational rolls and strength. At such time as the soldier was disposed of from the Army hospital system, he was dropped from the strength of the DOP, and his organization notified. The DOP forwarded to the unit a copy of the admission slip, and also the disposition slip on which the final diagnosis had been entered.

A suspense file was kept by the DOP to assure the transmittal of Service Records and allied papers of patients transferred to Base Section Hospitals.

The DOP also received the A & D Reports from Base Hospitals, and notified all divisions assigned or attached to Army of the dispositions of former members of their command who had been admitted to Base Section Hospitals. This was helpful in the forwarding of mail, and also enabled the divisions to maintain contact with key personnel whom they especially desired to recover.

A permanent file of all patients admitted to and disposed of from Army hospitals was kept at the DOP.

6.   Women's Army Corps

A detachment of the Women's Army Corps consisting of two officers and fifty-seven enlisted women was attached to the headquarters of Fifth Army early in the campaign. This was initially a self-supporting unit with necessary administrative and mess personnel. Experience taught that a separate mess for this detachment was unnecessary and undesirable, and it was discontinued. Enlisted women ate in the headquarters

company mess with the men, and the officers in the officers mess. The mess personnel were transferred to other units and were replaced by qualified clerks.

The detachment was divided into two echelons which were assigned respectively to the forward and rear echelons of the headquarters, one WAC officer serving at each echelon. Enlisted women functioned in practically all sections of the headquarters as clerks, typists, stenographers, and telephone operators. Ratings, except for those few authorized for detachment administration, were earned in each section in competition with the enlisted men. While enlisted women were not counted against the table of organization strength of the various sections and were carried as an authorized surplus, there was no authority for surplus grades of ratings.

Women in this detachment were very carefully classified according to their civilian training and experience, and proved highly efficient in their various assignments.

At each location of the command post a quarters area was selected which was partially isolated from the rest of the installations yet close enough so that no inconvenience was experienced. All women quartered with the headquarters lived in this area. This included personnel of the American Red Cross and of the Army Nurse Corps. British enlisted women attached to the British Increment of the headquarters were further attached to the WAC detachment for administration and quarters.

Although at times exposed to enemy air attack, no casualties occurred among WAC personnel. General health was good. During the rigors of the winter spent under field conditions in the Apennine Mountains no unusual sick rate was experienced. Morale was maintained at a high level at all times. Disciplinary problems did not exist.

7. G-1 Reports

The method used to render reports on the status of personnel to Army G-1 was developed and expanded by

experience throughout the campaign. It was based on the information found to be necessary to keep the Army commander currently informed of the status of the personnel of the command.

Daily reports were submitted by all units as of midnight to include all changes occurring during the preceding twenty-four hours. These reports were required to reach the G-1 section of the army by 1200 hours. Reports were forwarded by the most expeditious means—telephone, radio, or messenger.

The items reported in daily reports were as follows:

   a. Killed in action, died of wounds and injuries.

   b. Wounded and injured in action.

   c. Captured, missing in action, and interned. Personnel lost in action during the day who could not be accounted for and who were not included in the effective strength were reported in this category.

   d. Personnel previously reported missing (DM) who returned to unit control.

   e. Non-battle casualties—personnel hospitalized by reason of illness or injuries received not in action.

   f. Battle and non-battle casualties returned to duty— all RTU's who were dropped from unit rolls as a result of hospitalization. Personnel who had been reported missing in action were not reported as RTU.

   g. Date for period ending 2359 hours.

   h. Assigned strength—all personnel carried on unit rolls as permanent members of the organization.

   i. Effective strength—the assigned strength less hospitalized personnel not dropped from rolls and MIA not dropped from unit rolls. Included were AWOLs, Confined, Temporary Duty in United States, personnel at Rest Centers and Rest Hotels, and on Detached Service. Temporary Duty Personnel to Other Units were reported as effectives by parent units only.

   f. Battle and non-battle casualties returned to duty—

   k. Replacements received—only ''new faces'' assigned to reporting unit by a replacement depot were included. Former

members of the unit were not included in this category, but in one of the other categories.

It was recognized that these daily reports, because of time lag and the difficulty of securing accurate information during the confusion of battle, were an approximation of the true figures. However, inaccuracies were slight. Comparison with reports of hospital admissions, of clearing stations, and subsequent strength reports showed a discrepancy of less than one per cent.

In addition to the daily report, a weekly casualty report was submitted to Army by all units. This report totaled the battle casualties and non-battle casualties of the unit for the period covered by the report. Figures for infantry were shown as a separate item. Figures for all non-infantry were totaled separately. This report also showed the number of battle casualties and the number of non-battle casualties returned to the unit during the period. Infantry and non-infantry were again shown separately.

Bi-monthly reports covered the periods 1st through 15th day of the month and the 16th to the end of the month. These reports showed the status of absentees for the period covered by the report and classified them as follows:

   a. Number of personnel AWOL as of 2359 hours on last day of period.

   b. Number of personnel dropped from rolls as AWOL during period.

   c. Number of AWOLs returned to military control during period.

   d. Total number of cases of AWOL which occurred during the period. Those that went AWOL and returned to military control during period were included.

   e. Number of personnel in confinement on last day of period. All garrison prisoners, persons awaiting trial, and awaiting review of GCM were included.

   f. Number of personnel on Temporary Duty in United States on last day of period.

   g. Total number of personnel that departed for rest area, rest center, or rest hotel during period.

For purposes of control and check, negative reports were required in all instances.

8.   AG Casualty Division

To expedite the handling of all casualty reports and the reporting of casualties to the War Department, the Army AG Section required a casualty division, composed of two officers and twenty enlisted men. The use of both day and night shifts made it possible to complete the processing and clearing of casualty reports within 24 hours.

This division processed and cleared all Battle Casualty Reports (MTOUSA Form No. 6), Wounded Progress Reports and Burial Reports (QMC Form No. 1-GRS) originating in the Army.

It also checked all Letter Reports of Death, and kept a suspense file for following up all non-battle deaths to insure prompt forwarding of Service Records and Reports of Investigation (WD AGO Form No. 51), where applicable. Service Records were checked in all cases of death, and for all cases of MIA more than 30 days old. Many MIA's were found to be in Army hospital installations by a daily check against hospitalization cards received from the Army Detachment of Patients. Letters of Inquiry and Condolence were checked before forwarding to next of kin of deceased personnel.

A control over late Battle Casualty Reports was made possible by careful daily analyses. A daily breakdown by classification of casualty supplemented the monthly MRU report.

An additional important function of the AG Casualty Division was to train organizations in the proper preparation of Battle Casualty Reports.

9.   Rest Centers

The establishment and use of rest and recreation centers for both officers and enlisted men demonstrated the value of

· short periods of relaxation by the noted improvement of morale and the reduction of non-battle casualties occasioned by fatigue, neurosis, and mental exhaustion. The better the facilities for sleeping, eating and recreation and the fewer military restrictions and regulations imposed the greater were the benefits derived.

Physical facilities available for rest centers necessarily varied in various localities but certain minimums were found by experience to be essential. The facilities selected must be or must be made to be as nearly comparable to first class civilian accommodations as possible. A hotel or group of hotels is ideal but these are rarely available in sufficient number to accommodate the number of enlisted men it is desired to serve. Comfortable sleeping facilities are important. Where it was impossible or impracticable to secure real beds, mattresses of the proper size to fit the regulation canvas cot were procured by local civilian manufacture. An adequate number of blankets or comforters was furnished by the Quartermaster. It was invariably necessary to make extraordinary arrangements for lighting and heating facilities. Electric generators were made available from military sources. In one instance, at the rest center established in Florence, heat was provided from the boiler of a locomotive placed adjacent to the buildings.

In all instances the services of sanitation and bath units and of a complete clothing exchange unit were provided. This was found to be one of the most essential adjuncts to the rest centers. If the soldier was obliged to spend the time at the rest center without fresh clothes and adequate bathing facilities, much of the benefit of the rest was lost.

The establishment of the rest center messes required a considerable amount of planning, thought, and experimentation. Messes were set up to approximate as nearly as possible the appointments and service of a first-class hotel dining room. Fresh linen, dishes, silverware and waiter service were beneficial changes from mess kits and chow lines. Messes were in operation from 0700 to 2200 to accommodate the convenience of the men. It was found desirable to establish eating facilities in addition

to the regular messes run in conjunction with the rest center. This was done without cost to the government. Suitable civilian restaurants were selected and verbal agreements entered into with the civilian management. After some experimentation a standard arrangement was arrived at which was satisfactory to all concerned. Lunch and supper were served. The soldier patronizing these restaurants was charged a service fee of ten cents per meal. This ten cents was apportioned, seven and one half cents for the management and two and one half cents for a restaurant fund used as a reserve to bolster restaurant operation where necessary. The civilian management was responsible for the complete operation of the restaurant including the hiring of employees. In some instances it was found necessary to supplement the physical equipment of the restaurant with ranges and utensils from army sources. All such installations were closely supervised by the military. Food was provided by daily requisition of the regular ration, based upon an actual head count.

Recreational facilities were an important part of rest center operation. Motion picture theaters were a regular feature as were "live" shows providing U.S.O. or local talent. Libraries and small recreation rooms for table games as well as lounge rooms were provided at each center.

The American Red Cross cooperated in all rest center activities which coincided with the services the Red Cross was prepared to render. Information booths were established. Conducted tours, visiting points of local or historical interest, were regularly scheduled. Transportation for these tours was furnished by the units participating. Red Cross snack bars were established in each center and provided light refreshments throughout the day. A wrapping service for packages was made available. Entertainers strolling about the lounges during the day added an informal note to the entertainment features. Reading and writing rooms with stationery furnished by the Red Cross were a regular feature. A music room with instruments furnished by Special Service and operated under the supervision of the Red Cross was a popular addition.

Welfare Service was provided by a Field Representative of the Red Cross permanently assigned to the rest center. Dances were a major Red Cross activity.

Each rest center provided complete Post Office facilities and also the services of an Army Finance Officer for partial payments.

In an effort to provide an opportunity to secure local wines and liquors at more reasonable prices and of a better quality than could be obtained elsewhere, bars catering exclusively to enlisted men were established in army rest centers. These were operated as a civilian concession. Prices were controlled by the military and the liquor served was tested for purity at the source and again at the bar. The results obtained were good. Men were well behaved and cases of drunkenness rare. In one instance a cabaret type night club was operated under civilian management with military control. The agreement provided for a dance orchestra and floor show each afternoon and evening. Liquor was served at controlled prices. No meals were attempted and the club was closed during the evening meal hours.

The establishment and operation of rest centers was under the direct charge of the Army Special Service Officer. Allotments for the use of the rest center were made by the Army G-1.

It was determined that a period of four days at the rest center accomplished the desired physical and mental rehabilitation. A complete four days' rest was provided with personnel away from their units five days in most instances. Administrative considerations and the necessity of employing all possible economies in the use of transportation dictated that personnel on rest status be changed all at one time. Under this procedure unit transportation bringing personnel to the rest centers returned those leaving.

In January 1945 railroad facilities were such that a daily rest center train was inaugurated to take rest center personnel from Montecatini to Rome. Unit quotas arrived at Montecatini in the morning, were served by a bath and clothing exchange unit, given lunch at a rest center restaurant, and loaded on the train for Rome early in the afternoon. They arrived Rome the

16

following morning. Box lunches and coffee was put aboard the
train for the evening meal prior to departure. Midway of
the seventeen-hour run a short stopover was made at Grosseto
where coffee and doughnuts were served by the American Red
Cross. Additional coffee was placed on the train at this point.
Quartermaster trucks met the train in Rome and transported
the "restees" to the rest center, where breakfast awaited them.
A train commander, a train quartermaster, and train surgeon
were detailed by the army G-1 for each train.

Officers' rest centers provided essentially the same facilities
as those for enlisted men. In all instances it was possible to
secure suitable hotel accommodations. A straight requisition of
the property was made. There again the civilian management
was retained under military supervision wherever possible.
Each officer was charged one dollar per day service fee. Twenty
five cents of this went toward operating costs and the other
seventy five cents was used to supplement the ration mess by
local purchases. As and whenever surplus funds accumulated
additional services were added—free barber and manicure, free
wine with dinner, etc.

Personnel to operate these rest facilities was first taken on
temporary duty from the units in the army. This was found
to be unsatisfactory. It was too much of a drain on tactical
units and was inefficient because of the rapid turnover.
Recognizing the need, the Commanding General NATOUSA
authorized the organization of a special service company for
this operation. Medical and dental officers and assistants at the
rest centers were furnished by the Army Surgeon who detailed
personnel to this duty. Units were required to furnish duty
officers on the basis of one officer to each fifty men at the rest
center. Military Police were furnished in each instance by the
City Command.

10.   Special Service Activities

It was soon evident that there were many unforeseen
activities in which the Special Service sections at Army, Corps,

and Division levels must become engaged if maximum service were to be rendered. Previous planning had contemplated that the Special Service Officer at these levels would function in a supervisory capacity only, and that the actual operations would be carried on in the lower units. It was quickly determined that this method of operation was not satisfactory.

It was evident that the Special Service Section of higher headquarters must become actively engaged in the operation phases of the activities undertaken. Special Service warehouses were established by the Army and the several Corps to provide for the breakdown and distribution of Special Service supplies. Division sections in turn accomplished the breakdown and distribution of supplies to subordinate units. Film libraries for the rapid and controlled distribution of motion picture film and the allocation of projectors were established by Army and Corps.

Augmentation of the personnel authorized under tables of organization for Special Service Sections of the Army and the Corps was necessary.

Personnel from Special Service companies were placed on temporary duty as needed with the Special Service Section of Army, and the Section itself was increased to provide for 1 Colonel, 1 Lieutenant Colonel, 2 Lieutenants, 1 Warrant Officer and 9 enlisted men. This increase was allocated from the Army Provisional Overhead Company. Special Service Sections of Corps were increased proportionately by personnel from Corps troops placed on temporary duty with the Corps sections.

Transportation for Special Service activities was provided from unit motor pools.

To coordinate the Special Services for army units not attached to corps, an officer was detailed from each of the services to act as assistant to the Army Special Service Officer. Activities for army engineer units were coordinated through the engineer officer so detailed, for army ordnance units through the ordnance officer so detailed, and similarly for all army units.

Transportation, housing, and feeding of U.S.O. shows and entertainers was undertaken by higher headquarters Special

18

Service. Units lower than the divisions were not able to provide adequate facilities, and in some instances facilities could not be provided in any echelon lower than the army. The necessary facilities were usually provided by opening and operating hotels and rooming houses under the direction of Special Service Personnel.

11. Chaplain Activities

Complete chaplain coverage, especially for separate battalions having no authorized chaplain, was obtained only by cooperative efforts on the part of assigned chaplains. Service was rendered on an area coverage rather than on a strict organizational plan. Without neglecting their responsibility to the unit to which they were assigned, chaplains served troops within reasonable distances. Such services were coordinated by the staff chaplains of Army, Corps, and Divisions, each within his own area.

The necessity for providing prompt and complete religious solace to the sick and wounded was recognized. The table of organization for small evacuation hospitals provided only one chaplain. An additional chaplain was placed on duty with each of these hospitals so that both Protestant and Catholic patients received the ministrations of a chaplain of their own faith.

· The Army chaplain's section was augmented by three enlisted men from the Army Provisional Overhead Company. Two of these men were clerks. One was an interpreter. In all occupied areas direct contact between local church officials and the Army chaplain was inevitable and greatly to be desired. The interpreter in the chaplain section was indispensable in facilitating this contact.

A fund was established with the Purchasing and Contracting Quartermaster for the local purchase of expendable chaplain supplies such as flags, rosaries, communion wine, etc., which otherwise would have had to be shipped from the United States.

An attempt was made to establish an Army pool of chap-

lains for the purpose of quickly furnishing replacements for casualties and providing chaplain coverage for isolated units and separate battalions not authorized chaplains. Five per cent of the chaplain strength authorized for the entire Army, in proper proportion of faiths, was deemed desirable for this surplus. The plan was not successful because of the lack of available chaplains.

The shortage of negro chaplains in the Fifth Army to serve non-divisional negro troops was met in part by chaplains borrowed from the pool of chaplains maintained by MTOUSA.

12.   Awards and Decorations

The administrative processing of recommendations and the necessity of maintaining a uniform standard for the award of all decorations required the establishment of new methods and controls throughout all echelons of command from the regiments to the army.

An officer was added to the regimental adjutant's section as Awards and Decorations Officer. Through him were processed all recommendations for awards. He checked them for administrative correctness and passed them on to an awards board. The composition of this board varied among units and changed within units from time to time, but in most instances included the regimental executive officer, the adjutant, and a third officer selected for his experience and judgment. This board passed upon the suitability of the recommended award under the policies and standards established by Army Regulations and directives from higher headquarters. The findings of the board were sent to the regimental commander for final approval or rejection of the recommendation.

Similar controls were established in the headquarters of each division. Procedures in the various divisions varied only in detail. In some cases the awards officer was established as a part of the G-1 section. In others he functioned as a part of the Adjutant General's section. All divisions found that an

awards board was essential. The board varied somewhat in personnel but usually the Chief of Staff, the G-1, and one other officer constituted the membership. In each case recommendations were made by the board to the Commanding General who personally passed on each recommendation.

The procedures in corps headquarters were essentially the same as those in divisions.

At the army level, an awards division was established as a part of the Adjutant General's section. The awards board was made up of representative officers from various arms and services. This board met in actual session with the awards officer for discussion of each case. In lower echelons the boards seldom met together. The recommendations of each member were indicated by notations on a prepared cover sheet which was circulated with the pertinent papers in each case.

In all headquarters it was found necessary to provide the awards officer with enlisted assistants to do the clerical work and to write or rewrite citations.

Throughout the entire campaign the necessity for constantly urging combat commanders to make recommendations for awards was evident. There was a persistent tendency to delay the recognition of acts of heroism or merit until the unit had entered a period of rest. Unit commanders were constantly reminded of the morale value of a decoration promptly awarded.

13. Military Justice

Previous conceptions of the methods and means necessary for administering military justice were found to be based on an erroneous conception of the magnitude of the problem involved. Planning had been based on the expectation that each division normally would handle twelve to fifteen General Court Martial cases in any one month. Judge Advocate sections in divisions, corps, and armies were organized accordingly. Early in the campaign it was found that the figure considered normal was far too low. Some divisions

faced the necessity of disposing of ten times the number of cases expected. In order to handle this unexpected number of cases augmentation of JAG sections was necessary.

The Army Commander authorized an increase in the Judge Advocate General's Section of the army to provide for a Trial Judge Advocate and assistant and a Defense Counsel on a full-time basis. Divisions likewise added Trial Judge Advocates and Defense Counsels to their staff Judge Advocate's Sections. The problem as it applied to corps was not as acute, and cases were normally handled expeditiously without an increase in personnel.

An additional burden was placed on the offices of Judge Advocates because of the lack of trained personnel in the subordinate units where charges originated. A large proportion of cases forwarded were legally insufficient. Many incomplete or legally worthless reports of investigations were received. The legal errors in trials required an immense amount of correction. The need in all units down to and including the separate battalion for legally trained personnel familiar with the technicalities of Court procedure was demonstrated. It was difficult and impractical to train line officers adequately in the technicalities of Courts Martial. The necessity for using unqualified personnel made impossible the expeditious handling of the large volume of legal business.

Part of the large number of General Courts Martial cases was occasioned by the reluctance of unit commanders to use Special Courts. This reluctance was the result of a general to less than six months, and the physical difficulty of providing a proper place for the confinement of garrison prisoners. In consequence many cases which could have been handled by a Special Court were referred to General Courts.

Throughout the entire campaign the shortage of trained policy which discouraged the confinement of persons sentenced court stenographers was a continuing problem throughout all echelons exercising General Court Martial jurisdiction. This was occasioned by an actual shortage of trained personnel, and aggravated by the fact that other staff sections were

authorized higher ratings than were provided in the Judge Advocates Sections. Officers were found reluctant to refuse to concur in the transfer of an enlisted man when the transfer offered a promotion.

The practice of delaying the trial of General Court Martial cases pending a period of rest for the unit concerned was found to be impracticable. Witnesses had been killed or moved out of the practicable jurisdiction of the court, and the number of accumulated cases was beyond the ability of the court to handle during the time allotted. It was found necessary to withdraw interested persons from units actually in the line in order to expedite the disposal of court martial cases.

The long distances involved required many personal contacts in the field by the Trial Judge Advocates and the Defense Counsels to prepare cases properly. The normal practice of sending for witnesses by phone or letter prior to trial was found to be impracticable.

14. Mail

1. APO's

The selection of locations for APO's serving corps and Army was based upon considerations of ability to render maximum efficient service and convenience.

APO's serving the Army and corps headquarters were located with the rear echelon of the headquarters to which they were assigned. A money order and stamp unit normally operated with the forward echelons.

General assignment APO's serving Army and corps troops were located in areas where the maximum number of troops could be served. Frequently this was in the vicinity of the Class I supply dump. A location near a dump was not important, however. The pickup of mail by ration trucks was found to be undesirable and impracticable. Mail was picked up by units from the APO's as a separate function.

Mail received by base post offices for delivery to troops in the Army area was forwarded to the Army Postal

Regulating Section by truck or by air. The Army Postal Regulating Section, by means of truck transportation furnished by the Army, forwarded mail to truckhead APO's for pickup by corps and division APO's. In some cases it was feasible for the Army Postal Regulating Section to deliver direct to the corps or division APO's. This was done wherever practicable. Separate Army units were served by Army truckhead APO's.

2. Organization

Personnel authorized the Army Postal Regulating Section (T/O & E 12-602, 28 Sept. 1944), proved to be inadequate. This section initially had to provide guards on all vehicles delivering mail from the Postal Regulating Section. The assignment of Army Military Police to the Regulating Section partially alleviated this condition. It was necessary, however, for one trained mail clerk to accompany the mail to each APO destination to handle registered mail. Additional personnel as required were placed on detached service with the Regulating Section by the Army.

Tables of organization and equipment of postal regulating sections and large type army postal units had been drawn up with the expectation that the personnel of such units would always be attached to some other unit for rations. That procedure was found to be impracticable. It restricted the location of the unit, prevented its free movement, and caused undesirable confusion because of the necessity of feeding a fluctuating number of drivers and mail guards. The Army authorized an augmentation of personnel and equipment to the Army Postal Regulating Section and to one Army postal unit (Type J) to make them self sustaining.

3. Hospital Delivery

It was found desirable for morale purposes to deliver mail to patients in clearing companies, field hospitals, and evacuation hospitals. Mail was not delivered through normal APO channels to patients in such installations because they usually

remained there only a few days. Divisions, however, attempted to get mail to these patients wherever practicable. Daily information was obtained from the division clearing company Admission and Disposition sheets to determine the medical installation in which members of the division were hospitalized. Personal delivery was then made daily by personnel of the division APO. Check was made with the registrar's files at each installation to verify the presence of the individual and to determine the ward in which he was housed. If the patient had been evacuated to another Army medical installation, delivery was made to him there. If evacuated to a station or general hospital the mail was returned to the unit and forwarded through normal APO channels. About seventy-five per cent of the attempted deliveries were completed. This procedure normally required that two additional enlisted men and a 1/4 ton truck be assigned to the division APO.

15. Post Exchanges and Officers' Sales Stores

Post exchange operations were organized within the army to bring post exchange service to the front lines, and to make the staple and luxury items offered available to the combat soldier at all times.

All units of the army were served by a post exchange warehouse controlled by the Base Section and staffed by a Base Section Sales Platoon. Plans were made by the army to establish a post exchange warehouse under army control with a Sales Company assigned to the army. Non-availability of such a unit for assignment to army prevented the accomplishment of this plan. Close liaison and complete cooperation between the army post exchange officers and the Base Section were responsible for the satisfactory operation of the warehouse.

Items available to unit post exchanges were issued from the warehouse on a ration basis to unit post exchange officers, so designated by unit commanders. This ration was

established in accordance with War Department directives and the availability of supplies, based on the strength of the unit, and covered a half-month period. Unit post exchange officers operated on a twenty-one day credit at the warehouse. Normally the post exchange officer for each major unit drew supplies for all subordinate units. The division post exchange officer drew supplies for the entire division. Within the division area these supplies were broken down for subordinate units, and issued to the unit post exchange officers who in turn broke them down for smaller units until they reached the company or even the platoon level.

Issues at the warehouse were not automatic but were based on orders submitted in advance by the unit post exchange officer. Post exchange officers ordered such items as met their requirements within the limits of the ration. In all instances a certification to the strength of the unit was required.

The list of articles available from the United States was augmented by local purchases. Souvenirs and gifts were procured locally. By purchasing directly from the manufacturers in quantity the post exchange was able to offer many such items to the soldier at a saving of approximately fifty per cent. Some items which were received from the United States in very limited quantities were secured locally by arrangement for their manufacture. This usually required cooperation with the manufacturer to get his plant in order, efforts to secure electric power for him, and the release of raw materials frozen by AMG. Cigarette lighters were procured in this manner.

Three officers' sales stores were established in convenient locations, one in each corps area, one in Army area. These stores sold necessary items of clothing and equipment to officers and nurses. Their operation was under the direction of the army post exchange officer who delegated responsibility for individual stores in corps area to the corps post exchange officer. More stores would have been desirable but were impossible of establishment because of lack of operating personnel.

Personnel for the operation of the post exchange service within all units of the army were secured from units of the army. As required, enlisted men were placed on detached service with the army post exchange officer. This was undesirable because of the personnel drain on units and the frequent changes necessary.

A captain and lieutenant were authorized the army from theater overhead as post exchange officer and assistant.

Chapter Two

INTELLIGENCE

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1.   Fifth Army Interrogation Center

The function of the Army Interrogation Center was (1) to receive and interrogate Prisoners of War, Allied Ex-Prisoners of War and Civilian Internees; (2) to make proper disposition of this personnel; and (3) to disseminate the information gathered from the interrogations.

Prisoners of War were shipped by truck from Division Stockades to a Corps collecting point, then transported to the Army Stockade. Experience proved that primarily the Army Stockade should be as close to the Corps collecting point as possible so that a maximum amount of time could be saved. Evacuation to the Base Stockade was of secondary importance. On occasion, both Army and Base Stockades were located in the same city.

Vehicles for shipping were furnished by the Army Transportation Corps and the guarding of prisoners was done by an MP Escort Guard unit. However, the physical processing of the prisoners was done by the organic personnel of the Interrogation Center.

When prisoners arrived, they were taken to the Receiving Room where they were registered. The prisoner's name, rank, age, unit, nativity, civil occupation, place of capture, date of capture, how long in unit, intelligence qualifications and preliminary remarks were recorded on a Receiving Form. Officers and enlisted men were then impounded separately.

At times, the large number of prisoners taken made it impossible to interrogate every individual, so a selection was made of those to be questioned. This selection was based upon the remarks and recommendations of Division and Corps interrogators which were transmitted to Army along with the prisoners, as well as upon information taken from the Receiving Form.

Prisoner's rank was an important factor in selection, since an officer usually knew more of value than an enlisted man, and a non-commissioned officer had more to offer than the private. The prisoner's civil occupation revealed whether he was a good potential source of information; the former plumber was not as likely a source as was the bank teller. A great deal of reliance was placed on the prisoner's estimated intelligence classification as to whether he was a worthy prospect for interrogation.

The intelligence classification was done by an officer in the receiving room. From a brief conversation with a prisoner, an experienced interrogator estimated the man's intelligence and classified him as:

CI - cooperative and intelligent
CA - cooperative and of average intelligence
UI - uncooperative and intelligent
UA - uncooperative and of average intelligence
CD - cooperative but dumb.

The prisoners to be interrogated were selected by the coordinator of the interrogators, who also assigned an interrogator. The interrogator studied the Receiving Form and any documents belonging to the prisoner prior to the interrogation.

The questioning followed a non-routine pattern but sought the answers to a set of SOP questions similar to the ones found in FM 30-15.

Tactical information was gathered from the prisoner and checked against other sources of information for accuracy and reliability. For example, a reported gun location was checked against an aerial photo. Strategic information was handled in the same way. Full use was made of maps, aerial photos and reports from other sources of information during the interrogation.

A written report of the interrogation then went to the officer coordinator who checked to see whether further interrogation was needed or wanted. If the prisoner was of no

further use, he was put into the shipping compound to await evacuation to the Base Stockade. The interrogation report then went to the editing section where an officer-in-charge organized the mass of information into logical and readable form. After being edited it was prepared for final publication and dissemination.

The center devised a group of specialized rooms in which specialized interrogations could be performed: an Order of Battle Room where detailed interrogation could be held with the use of up-to-date Order of Battle maps and charts; a Reference Room where other sources of information were kept on file for use in interrogation; and a Photo Intelligence Room where the latest photo interpreted information was filed. These rooms were useful for highly detailed technical and specific interrogations. Normal interrogations, however, were not done in these rooms.

Specialized interrogations were quickly arranged. When a prisoner came through who was likely to possess medical information, the Medical Intelligence Officer was contacted, and he together with the interrogator questioned the prisoner. The same was done for Quartermaster Intelligence, Engineer Intelligence, etc. If a prisoner had recently arrived from Germany, PWB was often interested in questioning him about conditions at home, and headquarters wanted to know the route he had travelled on and its condition. Particular situations arose where certain priority types of prisoners were desired for interrogation, and form letters were sent to Division interrogators, listing types desired. Prisoners with the requisite qualifications were screened at Division and expedited to the Interrogation Center.

Our own Allied ex-prisoners of war were interrogated separately.

There was no set of rules an interrogator could follow. Experience was the best teacher. An occasional conference between interrogators for the purpose of exchanging recent interrogation episodes was found useful.

Interrogators had to know the native language of the enemy

thoroughly and intimately. Knowledge of other languages proved useful.

The interrogator had to be a good psychologist and able to get the "feel of a prisoner" as soon as he came in contact with him. This faculty came largely from experience. Once he determined the character of his prisoner, the interrogator could intelligently proceed with the interrogation.

It was not often found necessary to "break" a prisoner, i.e. to force him to talk against his will. Most prisoners were willing to talk, contrary to common belief. When it was necessary to "break" a prisoner, the clever interrogator easily did so by means of good psychology, bluff, ruse or camouflage. An SS captain once refused to talk, but in two minutes the interrogator was taking notes on valuable information. He found in the captain's documents an item to the effect that the prisoner had been at a concentration camp in Dachau, Germany, and that he had been ruthless there. The interrogator remarked that our rules (the interrogator pointed to some pamphlet that happened to be available) called for "certain disposition" of such people. Then there was silence and waiting. In a moment the captain began to talk.

When an interrogator was not an officer, he made full use of officer rank insignia during an interrogation. It was found that the German army was very servile to rank. An American "major" received more respect and cooperation than a staff sergeant when dealing with a German lieutenant, for example. Where possible interrogators should be officers.

After full use had been made of the prisoner, he was evacuated to the Base Stockade accompanied by certain remarks and recommendations. Any documents needed for further interrogation accompanied the prisoner; otherwise they were sent to the Document Section of Army G-2 for further study and/or disposition.

Certain qualified prisoners were detained to work for PWB in writing leaflets or preparing other forms of propaganda. Others were detained to work for OSS in various capacities.

Polish, French, Czech and Russian Missions were represented at the Interrogation Center. Each of these handled and disposed of such of its nationals as were processed and interrogated by the Center.

Records were kept on every prisoner received by the Center. The interrogation report was filed as well as the prisoner's final disposition. A file on the prisoner's unit was kept as to strength and as to personalities in the unit. The latter item contained only the names of officers and non-commissioned officers since a more complete file proved to be unnecessary.

It was found advisable to utilize large apartment buildings for the Interrogation Center and to divide the Center into three units: the stockade itself, the interrogation section, and the administration section. Each unit was protected by barbed wire, as well as by the wire about the Center as a whole. The advantage of such an organization was that the interrogators could have separate rooms, since quiet and the absence of all possible distractions greatly aided interrogation.

2. Interrogation of Prisoners of War in Divisions and Regiments

Initially, interrogation was performed by a six-man team at divisional and corps levels. However, much valuable time was lost while prisoners were evacuated to division before they could be interrogated. It was also found that in such a system, much detailed information of tactical value to regiment and lower units was not exploited. An interrogator working for one regiment only, could certainly do a more detailed and accurate job on the tactical situation in his regimental sector than the division interrogator who handled prisoners from three and sometimes more regiments. To correct these deficiencies, the following organization was established: one officer and two non-commissioned officers were detailed to interrogate at each regiment, and one or two officers with two

non-commissioned officers at the division cage. The interrogators at regiment worked solely for the regiment and were responsible to the S-2; those at division worked under the G-2. Some duplication of effort was found in this system, but it was felt that double checking was profitable.

The information obtained at regiment was immediately disseminated, first to the battalion which captured the particular PW, then to the other battalions and to divisions. Usually, by the time the PWs arrived at division, the divisional interrogator had been informed of the information extracted at regiment. This helped him in his own interrogation for further information or details. Such a system worked well but required close collaboration between S-2s, S-3s, G-2, G-3, and the interrogators at regiments and division.

In the beginning most interrogators worked with maps alone, but soon all types of aerial photos were used almost exclusively. It was much easier to orient a PW on a photo, especially an oblique. Close cooperation between the air photo interpreter and the PW interrogator was necessary. Oftentimes a photo interpreter was present during an interrogation to check information. Many profitable targets for the artillery and the air corps were obtained in this manner.

It became a recognized fact that the closest cooperation must exist between combat elements for whom information was obtained and the interrogators obtaining that information. To be of the most value the interrogator had to be well informed as to the tactical situation and had to have a good knowledge of future plans. He had to secure information as speedily as possible and see that it was properly and promptly disseminated. The sooner the PW got back to the interrogator, the faster information was extracted and disseminated. This was considered so important that lectures on this subject were included in every training program for troops.

Close liaison was maintained between interrogators and the division Order of Battle officer. Most of the latter's information came from interrogation of PWs, but at the same time he could supply the interrogator with much infor-

mation on which to base future interrogations. It was the interrogator's job to supply the missing links in the Order of Battle picture, and he could do so only when he knew what was missing.

Captured documents, too, were used to great advantage in interrogations. In fact so much information had been obtained from documents that all units were reminded, at every opportunity, to turn in every piece of paper found.

Only trained interrogators should be permitted to interrogate PWs. In one instance a PW, interrogated at a battalion CP by a German speaking soldier, stated that he had heard that the Germans were expecting our attack at any moment. The soldier knew German but was not familiar with German military expressions and reported that the Germans were going to attack. Our own troops had meanwhile planned an attack (it was then about H-hour minus six) but it was called off on the strength of this information. When the same PW reached regiment, the interrogator there detected the mistake, notified higher headquarters of the facts, and plans for our attack were resumed. Much valuable time and effort could have been saved had this PW been immediately evacuated, as directed.

Actual experience was the best method for developing interrogation technique. It was often found advantageous to have two interrogators work on one PW at the same time, the advantage being that it prevented the PW from deceiving the interrogators; he was kept too busy answering a flood of questions. Furthermore, two interrogators could do a more thorough job than one could. Another technique was to interrogate two or more PWs from the same unit at the same time. Information was obtained by this system because PWs often argued among themselves or tried to outwit each other.

3. Enemy Order of Battle

A separate subsection called Order or Battle (OB) was created by all G-2s and most S-2s. In higher headquarters this

subsection was further subdivided into specializing departments.

The purpose of the OB section was to collate and disseminate all information concerning enemy land forces (their strength, organization and disposition) in order to furnish a reliable basis for the assessment of enemy capabilities and intentions, both tactical and strategical. A study was made not only of enemy combat units but also of technical, service, labor, defense and quasi-military units.

The chief sources of information included prisoners of war, captured documents, agents, partisans, civilians, escapees, ground observation by friendly troops, photo intelligence, aerial reconnaissance, enemy and neutral radio and press.

In order to fulfil its purpose, the subsection divided its studies into several specialized departments covering:

    a. Forward enemy areas (including the zone of operations and the immediate Lines of Communications).

    b. Rear enemy areas.

    c. Organization of Enemy Formations and Units.

    d. Personalities and Field Post Numbers (similar to APOs).

    e. Tactics.

    f. Miscellaneous.

These departments are separately discussed in similarly lettered sub-paragraphs below.

    a. *Forward Areas.*

    This department was interested in the details of current operations, locations of troops and headquarters, movements and regional strengths. Most of the information of value was provided by PWs in the form of unit identifications, statements by PWs, and documents captured with the PWs. Materiel from other sources, such as ground and air observation and agents not far removed from the enemy front lines, was largely supplementary to that gained from PWs. However, agents, civilians, and escapees often gave valuable

clues regarding current moves and dispositions in the immediate Line of Communication area. Captured organizational documents sometimes contained new identifications and invaluable details on unit organization.

Information was recorded in periodic reports, in log books, or on cards giving the identification, locations, moves, and general information. Important features of current intelligence were kept on a large-scale map of the area under observation.

b. *Rear Areas.*

Information dealt with here was similar to that used in the Forward Areas department. Although a certain amount of information about training and rest areas came from PWs, escapees, and civilians, the organization of the enemy rear areas was determined chiefly from the reports of Allied agents. These reports, however, usually contained only fragmentary information, and were often inaccurate and at variance with one another. It was therefore seldom possible to gain a complete and detailed picture of any unit or locality from them alone. Only through a long series of collations could a true picture be had. When properly placed, agents were able to give useful information on the movement of combat formations toward or away from the front, or from place to place in the Line of Communications. In this connection, air observation and aerial photography were also of value.

Agents can be properly exploited only when they have been fully briefed. Their training in what to look for, what to report and how, must be thorough. Once they are in enemy territory it is essential that close contact be maintained between them and the OB section. To this end liaison officers were made available.

The department kept its information on cards arranged according to subdivisions of the area studied and according to units. Periodic summaries were produced and disseminated.

c. *Organization.*

This department concerned itself with the organization, composition and strength of enemy units both theoretical and actual. Since the organization of specific units in the theater of operations seldom corresponded exactly with that shown in our Field Manuals on enemy organization, and units varied in many respects from time to time, the necessity of studying the details of organization and composition of enemy units actually present was obvious. Close attention was paid to number and types of replacements, and to indications of strength and casualties. All sources on occasion afforded certain amounts of information, but the bulk of detailed and reliable intelligence came chiefly from the consensus of PW opinion and secondly from captured documents. Intelligence in all stages of processing was recorded in loose-leaf notebooks, indexed according to unit designation. Complete collations on organization were published as frequently as there was a need for revision of former information. To facilitate the periodic assessment of enemy personnel strengths, it was convenient to keep all strength reports and indications together. For this purpose a separate card file or notebook was used.

d. *Personalities and Field Post Numbers* (FPNs).

Names of officers and Field Post Numbers associated with all units were collated to facilitate the identification of personnel and units in the field, and to assist in the interrogation of PWs. The pertinent information was kept on cards or in loose-leaf notebooks, on a cross-index system. All the names were listed alphabetically and the FPNs serially, and both were also listed under their proper unit headings.

e. *Tactics.*

Information on enemy tactics was studied and disseminated. Such information came from friendly troops, PWs and captured documents. Other theaters of operations were also a good source of information on this subject.

40

f. *Miscellaneous.*

Tactical signs, unit insignia, morale, sattelite troops in enemy pay, and any special study that may have been required were also considered by the OB section.

4. *Exploitation of Captured Documents*

The Army AC of S, G-2 had attached to him from AFHQ a Documents Team, consisting of one officer and three enlisted men, to collect and examine captured documents. This team was capable of handling Italian and German documents.

In an advancing situation, one member of the team remained at Army while the rest visited cities and towns where the enemy had maintained offices and command posts, searching for and exploiting documents which the enemy left behind. The team sent documents to its Army man only when they were of value in their entirety. Otherwise it merely extracted and forwarded important information, transmitting the documents to higher headquarters.

Documents coming through the G-2 channels of Divisions and Corps were examined by this team at Army, and intelligence useful to the Army and its subordinate commands extracted.

The team received many documents for examination from the Army Interrogation Center and from CIC.

5. *S Force (G-2)*

It was found that a great amount of intelligence could be obtained by a systematic exploitation of buildings, factories, offices, etc., recently held by the enemy. This task meant the seizure and safeguarding of documents, technical data, equipment, records, and the arrest of enemy agents and suspects. A unit called S Force was organized to carry out such exploitation. Initial planning was done by AFHQ, coordination and control was exercised by G-2, 15th Army Group, and the active exploitation in the field was the responsibility of G-2, 5th Army or GSI, 8th Army, depending on the territory of operation.

An Intelligence Objectives Sub-Section (IOSS) of AFHQ compiled target lists and collected and collated detailed information on targets well within enemy territory. This unit:

a. Made and received nominations of targets to be exploited.

b. Conducted research for detailed information on targets as to entries, floor plans, management, expected results.

c. Pin-pointed targets.

d. Classified targets as to importance and type.

e. Made initial preparation of target folders, each containing all known information about a specific target, together with instructions for attacking the target.

S Force (G-2) at 15th Army Group maintained a connecting link between this agency (IOSS) and the operating Armies. It had the following functions:

a. Liaison with the Armies to determine imminent needs, priorities and operational details for future planning.

b. Liaison with IOSS to expedite planning.

c. Processing collated target data received from IOSS into a form for immediate operational use, and completing target folders.

d. Passing target data on to Armies as required.

e. Formulating and passing to Armies recommended plans of operations.

f. Assisting and coordinating the activities of exploiting agencies operating in the Army Group area, other than those operating directly under Army.

g. Receiving from all exploiting agencies and consolidating the inventories, receipts, releases, and status reports on all intelligence targets, with reference to intelligence materiel removed or left in place, for the benefit of later and more detailed exploitation.

h. Arranging for seizure of targets by Partisans prior to the arrival of our forces.

The Armies, through CI or GSI (b), coordinated, supervised and performed the actual target exploitation in the field within their areas. In carrying out the above, they:

42

a. Provided and supervised troops who would seize and safeguard intelligence objectives in sufficient time to prevent damage to or dissipation of intelligence targets and materiel from the time such targets were in our hands until they were released to a responsible officer or abandoned as worthless.

b. Arranged for the entry of interested agencies into the targets in time to accomplish their mission.

c. Ensured the completion and collection of receipts, releases, status reports and inventories on targets and passed such data to 15th Army Group.

d. Provided for the handling of targets discovered on ''spot'' information.

e. Provided for the arrest, detention and disposition of security prisoners.

Intelligence agencies which had any interest in the exploitation of targets assumed the following responsibilities:

a. To nominate to IOSS their known objectives or targets in enemy territory, together with all their own available information about the targets.

b. To bring to the attention of IOSS or 15th Army Group any special targets on which they received information, whether of interest to themselves or other agencies.

c. To contact Army for arrangements of movement, rendezvous and composition of the exploiting party well in advance of the operation itself.

d. To render such special reports as were needed.

6. *Enemy Equipment Intelligence Service Teams (EEIST)*

To overcome the many problems encountered in processing and examining enemy equipment and materiel, the Intelligence Division of Headquarters, Army Service Forces, organized teams of specialists on enemy equipment and assigned them to theater commanders who in turn attached them to the active armies and their service branches. The mission of these teams

was to collect enemy equipment, study it to determine new developments, disseminate the intelligence derived, and transmit the enemy equipment to the chiefs of their branches for further study. In addition to enemy equipment these teams collected other intelligence of value to the Army service chiefs.

The following description of the operation of the Medical Intelligence Team is typical of the operation of all the teams. The Medical Intelligence Team maintained liaison (1) with Division medical units, briefed them on any new developments in equipment, and advised them to be especially watchful for certain items of equipment; (2) with photo reconnaissance units to determine the presence and location of enemy hospitals, since such intelligence was important in future planning and developments; (3) with the Army Interrogation Center for questioning prisoners of war about the status of health and medicine in the enemy army; (4) with CIC, CSDIC, OSS and PWB for determining the health and status of medicine among civilians in the immediate front line and enemy rear areas; (5) with the Army Translation Section for the translation of documents pertaining to medicine and health.

The study of captured enemy equipment improved or led to radical developments of our own equipment. Several examples are cited here:

a. An automatic radio transmitter used as sea rescue equipment by our forces was copied from a German model.

b. With certain important modifications in the fuzes used, the German "Butterfly" anti-personnel bomb was redesigned by the Ordnance Department and adopted for use by the Army Air Forces.

c. As a result of a study of the German four meter base range finder, several of its design features were incorporated in a United States design.

d. The 15 cm and 21 cm German rockets were designed to rotate axially in flight by means of off-center vents. Actual firing of these rockets showed that they were relatively accurate. Our Ordnance Department applied this principle of spin-stabilization in our rocket development.

e. The Ordnance Department developed artillery and ammunition which was almost identical to the German 75 mm recoilless gun in basic design.

All echelons of troops should be constantly indoctrinated with the importance of captured enemy equipment and its proper disposal. "Souvenir hunting" must be curbed to preserve enemy equipment for research purposes.

7.   The Translation Section, G-2 Fifth Army

The fighting of a war upon foreign soil immediately presented foreign language problems. To overcome this difficulty, Fifth Army Headquarters organized a Translation Section under the jurisdiction of the assistant Chief of Staff, G-2.

This section consisted of one officer and six enlisted men. It was capable of handling the following languages: Italian, German, French, Spanish, Greek, and Hungarian.

This section translated all documents, within the language fields mentioned above, which were sent in by the various components of the Army Headquarters, excluding the Document Section, G-2, which had its own translation personnel. The bulk of the work was the translating of reports compiled by the Italian Liaison Section. The Counter Intelligence Corps had many reports to be translated for the benefit of G-2, such as confessions of enemy agents and testimonies of Italian Carabinieri and civilians. In addition to the translation of documents, this section furnished oral interpreters.

This section grew from one handling purely intelligence matters to one which translated and interpreted for other sections as well. The Engineers received claim letters, the Provost Marshal received complaints about our military personnel who had committed crimes, and the Inspector General had documents relating to various investigations, all of which were translated by this section. The Adjutant General Department submitted to this section many foreign documents which it could not distribute until they were translated.

The problems that this section had to overcome included obtaining competent personnel, training this personnel, and procuring adequate dictionaries.

8. The Italian Liaison Section, G-2 Fifth Army

After the Armistice with Italy on September 8, 1943, and the following Declaration of Co-Belligerency by the Italian government on October 13, 1943, the Allied Armies in Italy agreed to accept the collaboration of the Italian Army in many fields. This included the utilizing of all that the Italian Military Intelligence Service (SIM) had to offer, namely a trained and organized intelligence agency and personnel who knew the native language and the country's terrain, people, culture and environment.

The Italian Liaison Section was organized to coordinate SIM with Fifth Army Intelligence. Its mission was to collect intelligence concerning the enemy through its own channels and resources and transmit such information to the AC of S, G-2.

Through an elaborate system of agents the following types of information were gathered and transmitted to allied intelligence channels.

a. Enemy units—their location, strength, disposition and equipment.

b. Enemy defenses—locations of guns, minefields, trenchworks and strongpoints.

c. Possible targets for aerial bombardment—lines of communication, industrial plants of military significance, and supply depots.

d. The Italian Fascist Army—its locations, strength, personalities, and equipment.

e. Reports of an engineer nature—the flooding of the Pontine Marshes, the flooding or draining of rivers and water basins.

f. Reports on the results of allied air raids, both material and psychological.

g. Reports on public opinion in liberated and enemy occupied territories.

h. Information concerning the economic situation of German occupied Italy.

i. Reports on enemy agents, suspects and Fascists.

j. Reports on enemy committed war crimes.

k. And finally, the answer to any specific question that may have been posed by allied intelligence.

After collecting information and evaluating it to some extent on the basis of other sources of information, the Italian Liaison Section then edited and published the information in a daily G-2 Bulletin. This Bulletin contained only tactical or strategic information of high priority.

Strategic information of a long range nature was published in book form. The first volumes were "A Synthesis of the Italian Economic Situation", published in November 1944, and "Situation in Enemy Occupied Italy", published in February 1945.

The Italian Liaison Section also furnished Italian terrain guides for use by Fifth Army. These were especially helpful to small combat units which operated in mountainous terrain. In a moving situation these guides could give information on the best routes of advance, and in a static situation they accompanied our probing reconnaissance and combat patrols. They also acted as interrogators of Italian civilians, returning Partisans, and deserters from the Italian Fascist Army. The selection of this personnel was entrusted to the Italian Liaison Section which, together with CIC, investigated them for loyalty, knowledge of the region they would operate in, knowledge of the English language and physical, intellectual, and moral qualifications.

After the Arno River crossing, the allied army was getting in closer contact with the Partisan bands which were operating against the enemy in northern Italy. The Italian Liaison

Section took a major part in solving the problems of supplying, equipping, and employing the partisans.

The Italian Liaison Section, together with OSS, exploited the help which the civil population and Partisans could give as sources of intelligence and irregular operations. In the Eighth Army this same mission was accomplished by one unit called the Civil Liaison Branch, GSI Eighth Army.

9. Control of Partisan Activities

After the fall of Rome, it became apparent that the Partisans presented a major problem to be dealt with, if security, law and order were to be maintained in divisional areas. Very little was known about them at that time. They were a zealous group, carrying various sorts of arms, and without proper handling, would have been a menace to our security, communications and supply, as well as a source of terror to civilians.

CIC in liaison with AMG worked directly with the Partisans through G-2 and G-1. It was felt that this arrangement would help maintain security, which was naturally a CIC function, and would assist in maintaining law and order among the civil population, which was an AMG function. The similarity of ground areas covered by AMG and CIC made this an ideal arrangement.

As soon as a commune was taken by our infantry, a meeting was held with all remaining officials, professional men and other leading citizens of the commune, leaders of the Partisans and the CLN (Committee of National Liberation). Our missions were explained and their cooperation solicited. The Partisans were generally requested to lay down their arms. It was recognized, however, that in many instances Germans and Fascists were still hiding in the area, and, therefore, Partisans were allowed to retain their arms until the town was passed by division. Partisans were allowed to retain their arms when they collaborated with our troops.

Aid given us by Partisans can be divided into two phases:

(1) Civilian, and (2) Military. Under the civilian phase the Partisans, with the cooperation of CLN, maintained an internal police force. They made security arrests and reported known Fascists and suspects dangerous to our security. The Partisans and CLN maintained the public offices in towns where the regular officials were absent. They assisted with the evacuation of civilians, the distribution of supplies, and the resettlement of refugees.

From the military standpoint the Partisans infiltrated into towns before our infantry to prepare the way for us. They went forward with our tactical units to act as scouts and guides. They maintained guerrilla units on missions to supplement divisional tactical missions. They were used as anti-sniper and mopping-up squads. Others were used as interrogators or interpreters. In addition to the above, important intelligence was obtained through the contacts maintained by certain select Partisans with Partisan groups in German occupied territory.

10. Aerial Photography

A. GENERAL

During the course of the Italian campaigns, the use of air photos in the field developed to an extent which revolutionized many branches of intelligence practive. The demand for the products of aerial photography, the development of fresh techniques in their utilization, constantly introduced new possibilities in both the planning and the operational fields. The implications of these new possibilities were always in process of being worked out in the field, and nothing approaching a real standardization of practice was ever achieved.

B. PLANNING AND PRODUCTION

The covering of strategical areas, i.e. the enemy Army Group and Rear Army areas, was normally carried out on a semi-automatic program, governed by the growth of enemy

defenses, changes in his general dispositions, and our own operational intentions.

The flying of the Army tactical area was normally carried out in accordance with the requirements of Divisions, Corps and the Army. It was coordinated by the Photo Reconnaissance staff at the Armies.

As soon as semi-static conditions prevailed, however, it was frequently possible to formulate an Army program for flying fresh cover of the tactical area, which rendered unnecessary daily demands from lower units except for special requirements to be flown, e.g. at lower altitudes.

Thus, for the winter 1944/1945, the Eighth Army plan was to fly daily, conditions permitting, 36" vertical cover of the battle area to a certain depth, and to cover the enemy gun areas daily in a special sortie allotted to and controlled by each Corps. This latter practice was initiated in the autumn of 1944. Duplication with the general daily battle area sortie was accepted for the advantage of obtaining gun area cover early in the day for A/CBO to work on and subsequent action to be taken.

During the same period, the Fifth Army, holding a much more extended, mountainous front, was covering the majority of this front on a daily program of mainly 24" cover, devoting 36" sorties to specific areas, e.g., gun areas, as requested by Corps.

C. TYPES AND SCALES OF AERIAL PHOTOGRAPHY

It is emphasised that the volume and scale of air photos available during any period was always the result of the interplay of a number of factors: weather, availability of aircraft with cameras of different focal lengths, operational altitudes flown, the speed of ground operations, the accuracy with which operational developments had been foreseen, and the capacity for production of the photo laboratories available. However, it was found that certain scales could be accepted as normal for the production of vertical prints, on which most

of the other types of photos were dependent. These are given below in tabulated form:—

1. Vertical Prints

This was the basic form of air photo cover. Vertical print cover of the operational areas was carried out on as complete and exhaustive a scale as possible.

a. 1/50,000: not normally used for tactical purposes in the field, though produced for certain specialised uses, e.g., for map revision; in some cases the originals of 6″ focal length prints (giving approximately this scale) were used where a print covering a wide area was required, and the normal made-up mosaic was unsuitable, e.g., for artillery block plots.

b. 1/20-25,000: for general tactical use in mobile operations where larger scale cover was not available, since the area was so great that the bulk of larger scale cover was prohibitive (e.g. in the advance north from Rome), and also for laying down of mosaics in that scale.

c. 1/10-15,000: for routine interpretation of Army areas and for general distribution as basic cover, supplemented by larger-scale cover where practicable, and also for laying down normal scale mosaics.

d. 1/7-8,000: for interpretation of the immediate battle area; to supplement 1/10-15,000 scale photos; for general tactical use and distribution in static and semi-static operations; and for laying down special large-scale mosaics.

2. Mosaics (Bromide)

These were considered valuable for a wide variety of tactical uses, especially where the requirement was for a large area on a single sheet, e.g., for OPs, both ground and air, and for close air support generally, for use in tanks, and as a basis on which to record information.

a. 1/20-25,000: These were produced from time to time, but were considered more useful for Army/Air purposes than for general tactical use in the field, except, for

example, by armored units in mobile operations. As no larger scale mosaics were available, both armies made extensive issue of mosaics at 1/20-22,000 scale in the autumn of 1944 in anticipation of a breakthrough into the Po Valley.

      b. 1/10-15,000: These were produced for general ground use, the larger scale of 1/10-12,000 being considered more satisfactory. All mosaics produced were normally of the "uncontrolled" type. Mosaics of a suitable scale, e.g., 1/12500 or 1/25,000, were normally planned and laid down to correspond with existing map sheets.

3. Lithomosaics (Photomaps)

      This special form of mosaic was produced at different times by both Armies. Compared with the bromide mosaic they lost considerably in definition, though this factor depended on how fine a screen was used in the process of reproduction. They had the great advantage that, being produced by the Survey or Topographic Company, preparation and distribution could be carried out much more rapidly and economically than the corresponding bromide. Thus, in February 1945, Fifth Army began production of a series of 75 semi-controlled sheets, scale 1/12,500, covering the central tactical area from the front lines to and including Bologna, and to a depth of about 10 miles. Some of these were contoured. Eighth Army inaugurated a similar program in March 1945 in preparation for the spring campaign.

4. Obliques

      These were normally taken from heights up to 5,000 feet. During the winter of 1943/1944, many oblique sorties and pinpoints were flown at "Zero" feet (i.e. 150-250 feet). These missions were later discontinued as a regular program, though Tac/R aircraft would occasionally take steep low obliques of guns, bridges, suspicious objects, etc., in the course of a normal visual sortie. The particular use of obliques was for studying all types of "linear" features, such as coastlines (for amphibious operations), hill features and ridges, river

lines and defense lines. They were particularly in demand by assaulting troops and artillery OPs, and for engineer planning. They were less useful as a basis for photo interpretation, though in moutainous country they provided valuable cross checks of certain features, e.g., tracks. High obliques of mountainous areas were used extensively by the assault troops during the rapid advance of the French Expeditionary Corps over the Petrella massif in May 1944.

5. Photo Aids

Various forms of visual aids connected more or less closely with aerial photography may be recorded under this heading:—

a. *Enlargements ("Blowups")*: Suitable enlarged prints of cities were produced at 1/3-5,000 scale, and distributed generally for tactical use in street fighting. They were also used for administrative planning. A further use was in the briefing of pilots by Air Liaison Officers for close support missions. Fifth Army allotted a regular monthly quota of enlargements to each Corps which could be requested by subordinate units. Areas chosen under these allotments included most of the important defended mountainous features.

b. *Models*: These were normally produced for special areas (e.g., sections of the Gothic lines and of the Central Apennines) in 1/5-10,000 scale. Latterly they consisted of a plaster base, with an air photo skin. If required, topographical detail was modelled from air photo detail, and superimposed.

c. *Map Photo Prints*: Prints of maps or map sections were produced with overprinted detail, normally by the use of acetates. Showing defense or topographical information, they formed a valuable means of illustrating planning reports, before the issue of a standard defense or topographical overprint became feasible. A parallel production to the normal map print was the map print sortie plot, which was in effect a photograph of a map marked with the

plot of a sortie. This was found clearer and more practical for use in the field than a normal overlay.

D. PRODUCTION OF OVERPRINTED PHOTOS

The overprinting of additional detail on all forms of air photos became standard practice for certain special purposes or occasions. The actual detail superimposed varied according to the type of photo and the requirements of prospective users.

1. Types of Overprinting

a. *General "map" detail*: this was primarily a grid, either arbitrary or an approximation of the map grid. Additional detail included place names, map references or pre-arranged reference points all designed to facilitate rapid orientation and handling by the general user.

b. *Topographical detail*: Beyond the essential minimum requirements of ,"map" detail for general use, as described above, requirements of topographical detail showed too much divergence between different users for this to become standard practice, and it was normally only carried out on special demand.

c. *Defenses*: These were occasionally shown on mosaics, seldom on single prints.

2. Overprinting of Vertical Prints

A typical vertical gridded print production included an approximate map grid, prearranged artillery targets or reference points, and an approximate linear scale. An alternate form of overprinting included one map reference on each print for identification, together with the North point and scale. Single prints were not normally used for overprinting defenses for general issue. Single annotated prints were, however, issued in planning stages to illustrate the development of enemy defenses.

3. Overprinting of Mosaics

The superimposition of a map grid, even an approximation, on an uncontrolled mosaic, was, for obvious reasons,

impossible. Thus the normal practice, when a grid was required, was to superimpose it in arbitrary form. In view of possible confusion and duplication with the map grid, the arbitrary grid was never universally in favor. However, it was possible to plot map grid intersections, and this method was also occasionally adopted.

Divisions of an arbitrary grid were normally arranged to correspond with a standard grid size on a normal map, so as to facilitate use of the grid roamer or grid scale in the reading of coordinates.

Other detail frequently included on mosaics was as follows: place names, names of prominent features, spot heights, North point, scale.

Occasionally a series of mosaics were produced to show overprinted defense detail for strongly defended areas. Thus 1/10,000 defense mosaics were issued for the central passes of the Gothic line (especially the Futa pass), and later a series at 1/15,000 showing the Bologna perimeter defenses.

E. DISSEMINATION OF PHOTOS

1. Library Sets

A distinction was made between library sets of current sorties printed immediately after flying and distributed on a limited scale to interpreters, and sets of basic cover, i.e. reprint sets issued on a wide scale to all general users of photo cover.

Of current sorties, normally three initial sets were produced for Army Photo Center, and Corps and Division Photo Intelligence Sections, so that each interpreting agency had one copy of the correct frontage. According to conditions, the practice was to follow these up, within a period of hours, with 2-3 more sets, which enabled distribution to additional branches, such as G-2 at Army, Corps Artillery and/or Engineers, and Division Artillery.

2. Basic Cover

Because of a number of factors it was seldom possible,

or even desirable, to lay down standard scales of photo issue on an Army level. The policy consistently followed was to attempt to meet all reasonable demands, within the limits of the resources available, and future planning commitments.

The factors referred to above included the following:—

a. Variations in requirements between units, resulting from varying degrees of training and the type unit (infantry, armored, etc.).

b. Type of operations for which cover was required.

c. Availability of alternate forms of cover, e.g., prints, mosaics, obliques, enlargements, etc.

d. Reliability of maps.

However it may generally be stated that in both Armies a minimum of 30 sets of stereo-cover were provided for any division entering the line (assuming one set of stereo-cover as equivalent to two sets of non-overlapping cover).

Subsequently, in a static or semi-static situation, this was increased to 70 stereo sets, and to 100-120 per Division for a Divisional or Corps attack.

Preparatory to an Army attack, Eighth Army made a practice of preparing non-overlapping gridded print cover (36″, 24″ or 20″), for issue on a very wide scale, such as 500 non-overlapping sets per Corps. This was in addition to any cover which may have been issued before, and to any special requirements.

3. Reprints of Basic Cover

Under normal circumstances, it was the practice to select, for bulk reproduction as basic cover, a good well-defined sortie, even though not of recent date. In fact, depending on the speed of advance, the larger the prospective requirements of basic cover for a certain area, the older the sortie would tend to be.

This was normally no disadvantage to the general user, whose requirements were good scale and good definition. However, under certain circumstances, even the general aspect

of the terrain in the battle area changed so considerably as to require supplementary limited issues of current sorties to users of basic cover.

Some of these circumstances were as follows:

a. Effect of seasons in change of foliage and snow conditions. In mountainous areas, patches of snow were frequently used by patrols for orientation.

b. Effect of operations, causing the development of trackage and other obvious signs of military activity in static positions; the effects of fire and major engineer demolitions in the forward area, especially on houses and built-up areas; cratering, clearing of fields of fire, etc.

F. DEFENSE INTERPRETATION

1. General

Interpretation for defenses was the work of a few skilled personnel, with a few definite objects in view. There was a definite practice for the collection and collation of defense information and its recording on "defense overprints", for which both Fifth and Eighth Armies developed an SOP.

This section deals with the general collation of the results of defense interpretation, while the special procedure for the production of defense overprints is dealt with in the section following.

2. Division of responsibility for defense interpretation

Although Photo Intelligence Sections at all levels were responsible for collating and making available the defense picture to the unit to which they were attached, in practice the bulk of the work was divided between Armies and Divisions.

General interpretation of all sorties was carried out at Army. Divisions were responsible for detailed interpretation of their own front, especially with regard to minor defenses. The Division interpretation, being more closely in touch with local conditions and other sources of information

with which cross checking was possible, was accepted by Army for record purposes to an agreed depth of front. The latter, during the static conditions of the winter 1944 - 1945, was some 3-5,000 yds. Outside this "Divisional belt" the Army interpretation was accepted as authoritative, and, in addition, Armies reserved responsibility for major items of defense, such as guns, wherever they were located.

Corps Photo Intelligence Sections occupied an intermediate position, coordinating and collating the results of Army and Divisional interpretation, and carrying out what additional work was necessary. In Fifth Army, they were responsible for the production, through Army resources, of all normal operational defense overprints, and exercised greater control of Divisional interpretation than in Eighth Army. It should be remembered that the counter-battery fire organization was largely centered at Corps level, though the actual counter-battery interpretation was, for practical reasons, carried out by both Armies at their Army Photo Centers.

3. Counter-Battery Interpretation

This special aspect was centered at Army level.

In Fifth Army, counter-battery officers from each Corps were at the Fifth Army Photo Intelligence Center (FAPIC) and were responsible for selecting those parts of fresh sorties covering known gun areas for priority interpretation by the photo interpreters. They themselves did not interpret, but maintained the up-to-date counter-battery situation marked on photos, and kept comparative cover of the main gun areas.

In Eighth Army each Corps was represented at Army Photo Center by an officer on the CBO Staff who himself interpreted all counter-battery information. This arrangement was, of course, considerably facilitated by the practice, noted earlier, of flying special daily gun area sorties.

In both cases the results of counter-battery interpretation were survey-plotted to 12 figures and telephoned or wirelessed to the Corps concerned.

4. Dissemination of Information

Army Photo Intelligence reports were drawn up according to an SOP, with 8-figure map references and template references. All reports contained a general paragraph giving brief details of the outstanding features of the interpretation, for staff use. Eighth Army also reproduced the results of interpretations separately in a "Photographic Intelligence Summary", distributed periodically to Army branches, G-2 at Corps and Divisions and to all photo interpreters.

Divisional photo interpreters conformed less to a standard pattern. Normally items were reported in the form of 8-figure map references, but sometimes an overlay was issued. The former was recognized to be preferable for accuracy of transfer to a permanent record, and the latter more convenient for handling by forward units. Occasionally the results of Division interpretation were periodically shown in the form of an overprinted map photoprint, and there is no doubt that this was a near ideal solution, though not always available to a Division Photo Intelligence section.

The template was a valuable adjunct in all reporting of interpretation in cases where precise indication of detail was required, and where it was impracticable to achieve this by dissemination of marked photos. Fifth Army specified that Divisions' reports should follow Army practice in giving both map and template references for all major defenses, while Eighth Army adopted the alternative method of reporting periodically on marked prints. The template was also commonly used for controlling artillery fire with the help of air photos, whether from ground OPs or observation planes.

At lower levels, methods of reporting to fighting troops the results of defense interpretation varied from day to day, and use was made either of map and template references or overlays, or marked prints, according to practicability, the purpose to be served, and the tactical situation.

G. DEFENSE OVERPRINTS

1. General

The object of a defense overprint was to collate the enemy defenses, layout and sometimes general activity (such as military occupation, trackage), by means of conventional signs overprinted on a map of suitable scale.

2. Production

Scales used for the production of defense overprints varied normally from 1/10,000 to 1/100,000. In Fifth Army, overprints for operational use were produced at Corps level in 1/25,000 (and occasionally in 1/50,000 scale) according to the density of defenses and the tactical situation. Army produced overprints for staff and planning use in 1/100,000 scale, and was also responsible for special large-scale productions. In Eighth Army operational overprints were produced by Army in 1/25,000 scale.

Discussion for and against the inclusion of information from sources other than air photos (especially civilians) on defense overprints was based on the relative accuracy of the various sources. The characteristic of information from the interpretation of air photos is its absolute preciseness, though not necessarily reliability. Thus a photo may indicate beyond a doubt that a weapon pit exists at a certain pinpoint, but cannot always show whether the enemy occupies it or will fight from it. On the other hand, a civilian report may be reliable in indicating that the enemy does definitely occupy a defensive position, but may not show precisely where it is. Information from sources other than air photos was shown, if at all, in a different color (thus purple on Fifth Army overprints, as distinct from red). Air photo information was always regarded as confirming and superseding ground information. Eighth Army did not include ground reports on defense overprints.

3. Collation

It was found that an SOP for recording the results of

defense interpretations as they were produced was essential for the smooth planning and production of overprints whenever required. Both Armies codified their practice in this respect during a semi-static period, and introduced a system designed to be practicable in all operations except the most mobile.

In Fifth Army, Corps and Army collated on map overlays the results of interpretation at all levels, and coordinated this at regular intervals. Eighth Army used for this purpose sets of 36″ basic cover, which were annotated by Division Photo Intelligence Sections and forwarded together with overlays to Corps and Army. Thus, at all levels, it was possible to keep up both master-overlays and master-mosaics of the current interpretation of the defense system. All plotting from photos to maps for the final overprint production was centralized at Army.

Both Armies found it necessary to have a Photo Interpreter liaison officer, qualified to make decisions on the spot, whose special task it was to visit Corps and coordinate the collation of all photo interpretation for Army purposes.

H. SUBSIDIARY FORMS OF AERIAL PHOTOGRAPHY

There was a certain number of subsidiary forms of aerial photography which supplemented in the field the normal standard forms of high altitude vertical and medium altitude oblique photos. They were of varying origin, and represented either purely Army developments (photography from light aircraft), or the adaptation of a strategic Air Force service for tactical Army requirements (night photography).

1. Photography from light aircraft

This form of aerial photography originated in the ANZIO beachhead because of certain characteristic local conditions. These were: *a.* the type of country, which was flat, criss-crossed by deeply cut watercourses, where observation was very difficult, and the scarcity of natural OPs, *b.* the distance from centers of planning, flying and processing, and *c.* a period of weather conditions unfavorable for high altitude flying.

The result was that VI U.S. Corps began experimentally the taking of low altitude tactical photos from artillery observation planes, using for this purpose the personnel and equipment of APS (Army Pictorial Service).

The practice was continued and further developed by the Fifth and Eighth Armies, though on slightly different lines. The Fifth Army concentrated more on panoramic photography for commanders, and the Eighth Army more on close-range tactical photography. The Fifth Army utilized the services of the APS in this work, but there was no similar unit available in the Eighth Army.

2. Photography from light aircraft—Fifth Army

Forward teams of the Signal Photo Company, working under the APS branch of Fifth Army were constantly employed in tactical photography for commanders at all levels in the field.

Some of this photography was carried out from the ground (from Arty OPs) and some from light aircraft. Artillery observation planes were normally available, but where possible, liaison planes were preferred for the purpose, as they allowed greater convenience and better view. Work was carried out up to an altitude of 6,000 ft.

Most of the photography carried out was panoramic in type, and was used by commands down to battalion level for general planning and terrain appreciation. Photos were also used for PW interrogation, and in artillery OPs for the direction of fire, and were considered suitable for general tactical distribution down to platoon commands.

3. Photography from light aircraft—Eighth Army

This practice was developed in Eighth Army at Corps level, using artillery observation planes, with a local improvised organization as regards personnel, equipment and processing.

The object was to supplement normal photo reconnaissance by providing a local source at short call. It was

considered particularly valuable as light aircraft could operate in the forward areas at times when weather conditions rendered normal photo reconnaissance impossible.

Photos taken were of a tactical nature, and included short oblique line overlaps of enemy forward positions for the interpretation of local defense and track activity, and pinpoints of bridges, demolitions, enemy posts, etc.

4. Night Photography

There were no facilities under Army control for the flying of night photos. Sorties were occasionally flown on request for both armies out of the very limited resources of MATAF.

It was hoped that certain aspects of the enemy's activities not detectable by day could be recorded in this way, thus gun positions with camouflage removed, movement, etc.

Those taken on the battle area were dissappointing, from the point of view of detailed study of defences. The main value of night photography from the Army point of view remained the detection of activity and movement in the strategic and in the tactical areas.

11. Photo Intelligence at Division Level

In the early stages of the Italian campaign, there was a scarcity of trained ground force photo interpreters. For that reason, interpreters were attached only to divisions.

Two officers and two enlisted men were needed at division headquarters. Their duties included insuring that subordinate units had the proper photo coverage at all times. They provided such interpretation and studies as were required by any divisional unit which had no interpreters. Division artillery headquarters required such service when the counter-battery section of corps, for example, needed confirmed or corrected enemy gun locations. Close liaison between the photo interpreter and the Air OP had to become SOP so that visual targets and photo interpreted targets could be coordinated.

Each infantry regiment had a man who was capable of doing recognition work, and making general terrain studies and mosaics.

A trained photo interpreter was attached to division artillery headquarters during the operations at CASSINO. This innovation worked excellently from its inception and definitely proved the value of having a photo interpreter in physical contact with the units which could act with minimum delay on his interpretations. Areas made suspect by shellreps were referred at once to the photo interpreter for analysis and in some cases fire was brought to bear on an enemy battery before it had ceased firing. The interpreter was also of great value to the artillery S-2 in selecting areas for harassing missions, in locating mortars, and in making terrain studies for our own future positions.

Air photos, both vertical and oblique, annotated by the interpreter provided an accurate and current medium for questioning patrols upon their return from a mission. More important was their value in briefing patrols on the best routes to approach their objectives and return from their missions. Such photos were valuable to commanders in planning future operations, giving excellent intelligence on the terrain they would have to cross and take or defend. The battalion commander preferred the very low oblique which gave him an intimate and detailed picture of a small portion of the immediate terrain before him. The division or corps commander perferred the high oblique which told him what the terrain was for many miles in advance. By tying vertical photos in with oblique photos, commanders had a complete intelligence picture of terrain.

Six inch vertical photos enlarged to a scale of 1:25,000 and provided with an arbitrary grid were in great demand by the artillery. Such photos were very valuable as firing charts.

G-4 used terrain studies made by the photo interpreter to determine best routes and means of supply and evacuation. PW interrogators obtained accurate information from photos which was useful in interrogations.

12.   Target Section, Fifth Army G-2

A.   GENERAL

The major function of the G-2 Target Section was the collection, collation, and evaluation and dissemination of all information bearing on targets suitable for attack particularly by the Air Force supporting the Army in the field.   Army artillery and the Navy were also kept fully informed of targets suited to their capabilities.

The Army channel for requesting Air Force support was Air Support Control, to whom primarily all information was submitted.   Routine materiel was disseminated widely, for information, to the supporting Air Force and to Army branches.

British procedure in the Eighth Army was essentially the same as that of the Fifth Army.

B.   COLLECTION OF INFORMATION

1. Sources

All G-2 sources were consulted daily, the following being the most valuable: OSS and other agencies in enemy rear areas, photo reconnaissance, and PWs.   As a later development, agents were provided by OSS specifically for the tasks of the Target Section, and their information sent by wireless link, soon became the fullest and most useful source.   Linking up with partisan groups, they were often able to draw on information from a wide area.

2. Types of Targets

a. *Stationary targets*: dumps, troop occupied areas, Headquarters and all kinds of installations.

b. *Opportunity targets*: tank and troop concentrations, motor transport columns.

c. *Communications*: bridges, vulnerable points on roads and railways.

d. *Targets to avoid*: restricted zones, hospitals, camps of allied PWs, areas held by partisans.

3. Briefing

All sources, especially interrogators and agents, were constantly supplied with detailed briefing notes, and urged to constant efforts to pinpoint targets and produce information in the form most suitable for utilization. Without this constant briefing of sources, many targets would not have been recorded at all. An important part of the process of stimulating the source was regular "thank you" letters, in which the action taken against targets reported was summarized, with a brief note of their value and importance. This information was passed back to all sources, including agents (by wireless); a similar function was fulfilled by Bomb Damage Assessment reports (BDA) passed back to the Air Force.

4. Photo Interpreters

Three officers were fully employed in the following tasks:

a. Seeking photographic evidence for ground reports. It was found that about one out of three ground reports could be confirmed on air photos.

b. Listing suitable targets from direct air photo interpretation.

c. Preparing annotated photos of confirmed targets with written reports for Air Force use.

d. Reviewing periodically all targets, and issuing target activity reports and BDA reports.

C. COLLATION AND EVALUATION OF INFORMATION

All information, while in process of confirmation, was collated on a simple map-overlay, on which the location and all information bearing on a certain pin point were recorded.

When a target was confirmed, i.e. air photo evidence was found to bear out a ground report, it was transferred to a card index, and issued in the Section's routine "Target Report".

From thence onwards its case history was recorded, i.e. information from all sources showing its activity, details of attacks carried out, and BDA reports.

All targets were graded, according to their importance, as A, B or C; in addition, however, priorities changed from time to time according to the Tactical Situation. Thus, just before an attack, assembly areas, bivouac areas and Headquarters would receive highest priority.

All targets were also cross-indexed as to type; thus it was possible to present at short notice a selection of targets, either geographically or by type, for any particular program of air support.

Photos taken shortly after a bombing attack formed the basis for Bomb Damage Assessment reports, which, with annotated prints, were forwarded to the Air Force for the information of the squadron which did the bombing.

Routine photographic check-ups of all targets formed the basis of target activity reports, showing variations in the grading of a target as the result of air attack and the changing tactical situation.

D. DISSEMINATION OF INFORMATION

1. General

Distribution was made in three forms:

a. Daily submission of target programs to Air Support Control at Army.

b. Routine dissemination of target information to Air Force and Army branches.

c. Presentation of special reports to ASC and other Army branches.

2. Daily Submission of Targets

During active periods, suitable targets for inclusion in the next day's air program were submitted at a joint conference at which Air Force, ASC, G-3, and other interested sections were represented. Selection was governed by the type

of target to be given priority, and the nature and extent of air
support available.

3. Routine Dissemination: The periodic "Target Report"

This was the routine method for dissemination of all
target information on the long-term support of the Army by
the Air. The following typical information was given:
1. New Targets, including:
    a. PRU interpretation report,
    b. Ground source reports, if available,
    c. G-2 Comment,
    d. Copies of target photos attached.
2. Target Activity Report, i.e. a review of the
behavior of a previously reported target, with indications of
whether it was still active.
3. Bomb Damage Assessment, i.e. PRU inter-
pretation report.
4. G-2 Discussion, i.e. general comment on the
enemy's rear area situation, suggested priorities of targets,
etc.

Distribution was to supporting Air Force, branches
of Army, higher, lower and flanking echelons.

4. Target Photos

An essential function of the Target Section, in con-
nection with the presentation of any new target, whether for
the daily program or in the Target Report, was the prepara-
tion of target photos for Air Force use.

These were printed with the following standard
annotations reproduced by acetates: target photo reference
number delineation of target, description of target, coordinates,
place name if any, North direction.

Any number of these might be presented, from one for
the daily program, to forty with the periodic Target Report
to the Air Force, for distribution to all squadrons supporting
the Army.

5. Special Reports

By reason of its special organization, the Target Section was able, from time to time, to present special reports such as the following to branches:

1. To ASC when a build up had been confirmed over a period in a certain enemy rear area, suggesting a program of attack.

2. To PWB, suggesting suitable areas for activity.

3. To City Command Section, summarizing bomb damage in a certain area as affecting the selection of future accommodations and sites.

E. CONCLUSION

It was considered that the successful working of a Target Section was based on the careful briefing of ground sources, adequate resources for photo cover and interpretation, and good coordination and presentation by intelligence officers.

13. Tactical Aerial Reconnaissance in the Fifth Army

Tactical aerial reconnaissance in the Italian campaign was handled in a somewhat different manner from that prescribed in the then current manuals and circulars. The system used proved highly effective.

All tactical reconnaissance for Fifth Army was centrally coordinated by the Fifth Army G-2 Section. Army requested an allotment of missions from the Tactical Air Command which held operational control of the squadrons being used. The number of missions made available varied with the Army frontage, the number of corps and divisions, the Tac/R requirements of the air forces, and the situation.

All requests from units of the Army for visual reconnaissance, photo reconnaissance, artillery reconnaissance and naval gun fire spotting were submitted through the corps to the

Army G-2 Air Officer. He coordinated and combined missions, allotted priorities, and then transmitted the missions direct to the various squadrons by telephone or teletype. These missions were also relayed to Tactical Air Command which reviewed them and issued a directive to the squadrons confirming the missions to be flown. When special missions were not requested, an SOP cover of the Army area was flown. This system had the advantage of close liaison and direct interchange of information between Army and the Tac/R squadrons.

Keeping Army missions under the centralized control of Army G-2 had the advantages listed below:

a. Information from the many sources available to Army G-2 could be coordinated with Tac/R to avoid duplication of effort, or could be checked by Tac/R for confirmation or denial. For example, the G-2 Air Officer was in close contact with PRU which was attached to G-2. Tac/R photo requests were checked against PRU coverage for the day, thus preventing duplication of photo missions.

b. It avoided conflicting requests being submitted to the Tac/R squadrons or Air Command by the corps. Army G-2, with access to the complete Army situation, was in the best position to allot mission priorities to the corps. It provided a central agency at Army to apportion the artillery adjustment missions flown by the Tac/R squadrons.

c. It enabled tactical reconnaissance missions to be closely coordinated with fighter bombing, armed reconnaissance and other air efforts of the Tactical Air Command.

d. It provided for the complete exchange of ground and air information between the intelligence and Air Liaison Officers of the Tac/R squadrons and the Army G-2.

This system kept to an operating minimum the channels between the ground unit requesting the mission and the reconnaissance squadron performing it, thus obtaining quicker results. The method used in Fith Army was believed to be more direct and probably more effective than the alternate system under which requests for information originating with the ground force at corps of lower units were transmitted by the

nearest Ground Liaison Officer to Army Headquarters, where they were filtered in the Army Air Section and then transmitted to the Tactical Air Command and the Tactical Control Center. Apparently under this system it was intended that the Tactical Air Command submit the missions to the reconnaissance group which in turn would assign them to their Tac/R squadrons. Compared with the direct method employed in Italy, this system seemed unduly cumbersome.

The communications system employed was very complete. Army had direct telephone or teletype communications with the squadrons by which it passed spot mission requests to the squadrons, and also kept the squadrons posted on the ground situation. The squadron in turn transmitted results of Tac/R, artillery adjustment and naval adjustment missions to Army. Each squadron had an SCR-299 or SCR-188 radio over which reconnaissance results and spot photo interpretation reports were broadcast. The reconnaissance reports were broadcast immediately after the pilot was interrogated. Corps, divisions, or any other units could receive reports by monitoring the Tac/R frequency. There was also a radio link between each Tac/R squadron and the Army Air Support Control. Mission requests from Army G-2 could be transmitted and results received over the radio in case of a breakdown in wire communication.

Air Liaison Officers at the squadrons themselves played an important role in the results obtained by Tac/R. Their duties were:

       a. To inform the squadron of Army intentions, and to present to Army the Air Force side of any question.

       b. To keep the squadron informed of the ground situation.

       c. To brief pilots for missions.

       d. To interrogate pilots after landing to obtain from them the maximum amount of accurate information.

       e. To insure prompt dispatch of information and photos to the ground commander.

    f. To check the establishment and maintenance of communications between Army and the squadrons.

        g. To instruct pilots in Army Ground Force subjects.

    The aircraft performing tactical reconnaissance operated in pairs. The head pilot observed ground activity and his "wing man" provided him protection against surprise attack by enemy aircraft. Because of the vulnerability to flak, the reconnaissance flights were made at altitudes from 3,000 to 10,000 feet, and usually at about 6,500 feet. Reconnaissance flights at lower altitudes proved uneconomical due to the added hazards. For this reason, Tac/R was often unable to obtain detailed information by visual reconnaissance. It could rarely locate vehicles parked near trees, properly camouflaged gun positions or deployed troops. Information obtained by Tac/R was thus limited to enemy movements of vehicles or trains over lines of communication to the enemy rear, or of conspicuous details such as road blocks, blown bridges and firing guns. The only practical way of obtaining more detailed information was by photographic coverage. Tac/R planes equipped with vertical cameras were utilized to obtain photos of small important areas when higher medium clouds prevented the high altitude PRU coverage. Vertical Tac/R photos were suitable for pinpoint photos of bridges, road blocks, etc., and for supplementing the pilot's visual reconnaissance of a suspected area. A few Tac/R planes were also equipped to take oblique photos. The purpose to which the oblique photos were to be put had to be considered when requesting this type coverage, and so the angle or "tilt" desired had to be specified.

    Each Tac/R squadron had a photo interpreter who accomplished first phase photo interpretation and broadcast the results over the Tac/R net or called the results into Tactical Air Command and Army G-2 Air.

    Profitable targets located by Tac/R were called to the local air controller at Air Support Control who would, in turn, call the information to the fighter bombers in the area. The controller arranged an immediate rendezvous over a prominent

landmark and the Tac/R planes would lead the fighter bombers to the target. This system proved very effective.

Staff officers should be acquainted with the limitations and capabilities of aerial reconnaissance. This knowledge will assist in planning, eliminate misunderstanding, promote the maximum air-ground cooperation, and produce the most effective results.

14.　Briefing and Interrogation of Tactical Reconnaissance Pilots

Briefing and interrogation of pilots was the most important duty of the Air Liaison Officer with the tactical reconnaissance squadron. The information obtained from the Tac/R pilot was directly proportioned to the quality of briefing and interrogating.

To fulfil his liaison duties, the ALO needed to gain the confidence and respect of every pilot. Without this respect, he could never obtain the best results. The ALO needed a thorough knowledge of the character and personality of every pilot. He had to know when the pilot's information was reliable, when to discredit information and when to send follow-up missions to check a weak report. The ALO had to decide what reliability was to be placed in a pilot's report.

The following information was given in briefing a pilot on visual, photo and artillery missions as a whole:

a. A clear picture of the ground situation including the location of forward troops or routes on which our troops were located. A general idea of the ground strategy helped the pilot understand the "why" of the mission. Care was taken not to reveal future ground intentions.

b. The latest Bomb Safety Line was impressed on the pilot and it was pointed out that observations must begin at our advanced troops and not at the BSL.

c. A complete report of all enemy AA areas and other aircraft flights, both friendly and enemy.

d. Any necessary R/T call signs of air and ground units and the use of VHF channels.

In addition to the general points common to all missions the following was covered for the visual reconnaissance:

a. The area to be covered. This had to be within the limitations of the aircraft and the pilot.

b. If there was a specific request to be carried out on the mission, the pilot was given the complete details as well as hints which would help him fulfil the request. For example, if guns were looked for, logical gun areas were pointed out.

c. All possible information on probable movements, suspicious areas, gun areas and other military installations were obtained from the Army G-2 and passed on to the pilot to aid in the mission.

The pilot assigned a photo reconnaissance mission needed advice from the ALO on intervalometer settings, speed of plane and altitude to obtain the desired scale and overlap. Tac/R photo runs required excellent navigation and to aid the pilot in this he was shown "checkpoints" and when possible, was briefed on a photo mosaic covering the area.

The amount of briefing required for an artillery adjustment mission depended upon the experience of the pilot. If the pilot had performed many successful adjustment missions, he needed only the details of his mission. If the pilot were new, he was given a brief review of procedure. The following details were common in briefing all pilots on an artillery adjustment mission:

a. A complete description of the target was given. If a shoot was for targets of opportunity, the pilot needed to know what he might expect to find. All available photos of a target area were used. Target locations were marked on the pilot's map with the proper reference number and name.

b. Our own gun locations were given to the pilot.

c. The line of fire was pointed out with reference to north line, roads, streams and other landmarks.

d. The time the pilot was to arrive over his target, and the length of time he was to remain in the target area if radio contact was not made with the firing battery at the

appointed time. The time to remain over the area while actually adjusting depended on the completion of the mission, gas supply or previously laid down operational policy.

    e. The caliber of guns firing the mission was given because in most instances that determined the method of fire to be expected and gave the pilot an idea of what size of burst and what accuracy to expect.

    f. The time of flight of the projectile was given. It was important that the pilot know this so that he could position himself to observe the bursts after the guns fired.

    g. Channels and frequencies for the shoot were pre-arranged, and the pilot given the call signs of the aircraft and ground station together with those of any other stations that could be used as alternates.

    h. The method of fire was determined by the nature of the target or the desires of the artillery. The pilot was briefed on the method to expect. All points of any particular request were cleared before the planes took off and not later by radio from plane to firing battery.

    i. Pilots were given a photo prepared with concentric 100 yards circles around the target and the line of fire marked. This assisted in judging the distance of the bursts from the target. If shoots were to be done from a map, at least a 1/50,000 scale was used. If photo mosaics were available, the target locations were pointed out on these with reference to terrain features.

    j. The artillery was prepared to furnish neutralizing fire on AA positions that hindered the mission and the pilot was briefed on how to call for this fire.

    Of equal importance with briefing was the interrogation after the mission. This was particularly true of visual reconnaissance where all the results of the mission had to be brought out. The interrogation was conducted with only the two pilots who flew the mission and the interrogator present. All necessary maps, photos, and identification charts were available to aid the pilot in determining what he saw.

    All movement which the pilot observed was taken together

with the direction of movement, time, and if possible, types of vehicles. For plotting movements the 1/250,000 scale map was sufficient. If movement was on secondary roads near the front lines, a larger scale map was used. If gun positions were seen to be occupied and active, the pilot was provided with a 1/50,000 scale map to give an accurate location. Other military installations were reported by six figure coordinates when possible.

The interrogation of a photo mission required the extraction of information necessary for the titling and plotting of the photo. This included:

    a. Coordinates of photo strip.

    b. Altitude flown.

    c. Course of aircraft during photo run.

    d. Time photo was taken.

    e. Weather conditions over target.

Even though the mission was out only for a photo, the interrogator was sure the pilot reported all visual observations made during the mission.

The interrogation of an Arty/R mission served as a means of assessing damage to targets brought under fire and for correcting the pilot's adjustment procedure. Particular attention was given to the conditions of communications and the procedure used by the pilot. If there were faults in the pilot's manner of conducting the adjustment or confusion on his part as to what the battery did, he was corrected and informed immediately after the interrogation. All information from the interrogation was passed to the artillery and the artillery in turn furnished information which served to check the pilot's statements.

The Arty/R mission also provided valuable intelligence information since the pilot had spent approximately an hour over a very small sector and could furnish an accurate account of enemy activity there.

15. Patrol Operations Under Winter Conditions

1. General
The winter operations of Divisions in Italy were confined to mountainous sectors where the enemy front lines were relatively close to our own lines and where the situation was static and relatively quiet.

2. Skis and Snowshoes
Mention of winter patrols naturally suggests the use of skis but this was not practical for several reasons. First, unless a man was an expert on either skis or snowshoes (and experts are not made overnight nor during a single winter season) this additional equipment was usually more of a handicap than a help; second, the distances covered by patrols seldom were over a few thousand yards, eliminating the necessity for rapid long distance movements across country; third, with the terrain so cut up by deep draws and defended ridges, patrols had to follow routes which were quite unsuitable for the use of skis. During much of our winter operations the snow had melted leaving a great portion of the ground covered by sharp rocks and deep mud.

3. Areas to be Patrolled
A general policy covering the type, strength, and frequency of patrolling was given to the regiments. The regiments determined which areas would be patrolled and the type and strength of patrol to be employed in each case, and submitted their daily intentions to Division Headquarters for approval. Information obtained from front line units, prisoner interrogation, and artillery, ground and air OP's was studied to determine the enemy occupied areas and the weak spots in his defenses; and together with large scale (1/12,500) maps and the latest aerial photos, suitable routes of approach were selected.

Patrol leaders and their key personnel made an actual ground reconnaissance on at least one night before the operation to confirm the depth of the snow, to select control points, assembly areas, recognition points, and routes of withdrawal.

4. Selection of Routes

The terrain in "no man's land" was made up of woods, open fields, or ravines. In the woods the shelling of several months had broken the trees and littered the ground with branches and twigs. When the ground was frozen it was practically impossible to walk through these areas quietly. The only satisfactory way to go through these areas was to crawl, the lead man clearing a path for the patrol to follow. Woods such as these provided little or no concealment and were avoided as much as possible.

Open fields were also avoided except on the darkest of nights, and even then they were most difficult to cross because of the machine gun fire which the enemy used to keep them covered.

On this account the deep ravines were usually selected as patrol routes. The use of this rugged terrain with its steep and slippery banks called for double the usual exertion. Men tired quickly and, if not careful, lost their footing.

The lack of suitable routes and room for maneuver sometimes required the repeated use of the same general routes. Trackage in the snow and mud was very noticeable and routes had to be altered, if at all possible, to avoid ambush. By varying the route by as little as 25 yards, ambushes often were successfully by-passed without detection. This was made possible by the use of the numerous smaller draws branching off from the larger ravines.

Smaller draws were favored because they provided defilade from the machine gun and mortar fire which the enemy had accurately zeroed in on each of the larger ravines. However, they confused patrols as to direction, distance, and interpretation of sounds.

Once in a draw there were no short cuts. It was neces-

sary to proceed to the end of it in order to secure the flanks. Except in emergencies, it was not practicable to climb to the top of the ridge and look to the flanks, as the banks were too steep and too much noise was caused by the falling of loose dirt.

There was little chance to fight back or avoid machine gun or machine pistol fire in a draw. It was hard to disperse, except in depth.

Snow seldom stuck to the steep banks of the draws though the bottoms were well covered. This made it necessary to remove snowsuits to conform with the background. Patrols often changed into and out of snowsuits several times in one night.

While working in winding draws with many tributaries, it was impossible to find prominent landmarks for guidance and check points. This was overcome by a prior study of the positions of searchlights which, when lit, were quick and accurate means of orientation.

It was not hard to walk quietly on muddy ground if pools of water could be avoided. The only handicap mud gave was in its sticking to the boots, making them heavy, which caused the men to tire faster. The slippery conditions made footing treacherous.

The changing picture in terrain from night to night caused some trouble. As the snow melted it bared shellholes, trees, rocks, and trails that were not seen before. Recognizable landmarks would disappear. A patrol leader, though he had passed over the same route several times, sometimes would find such a changed picture of the terrain that he was easily confused as to his location.

Crusty snow had to be broken carefully. Once broken through it was possible for every man to follow in the same footsteps.

The static winter situation gave the enemy ample time to lay minefields. Patrols had to be briefed from air photos about newly mined areas as well as reminded of old minefields. Mined areas were avoided by patrols, and when this was not possible, a mine lifting party accompanied the patrol.

5. Personnel

The same qualities desirable for any patrol were desirable for winter patrols. In addition, men needed exceptional endurance. Once the men became heated, coughing always followed. Patrol members carried half of a Codine tablet (the equivalent of a dose of cough syrup) which did well in tiding them over the coughing spell.

In order to maintain efficiency and to meet combat emergencies during the return, patrols were seldom expected to lie in ambush or in observation longer than one hour after having become overheated and soaked by the rain, slush, and mud.

6. Clothing

The British type snowsuit was preferred to our parka for several reasons: it is lighter; does not impair the hearing during the movement of the head; furnishes cover for the dark legs which are otherwise sharply outlined against the snow; may be removed and easily carried when the color of the background changes; and fitting loosely obscures the outline of a man's body. It can be easily washed and rapidly dried.

Wrapping shoepacs in burlap sand bags to avoid slipping was also recommended. This proved much more satisfactory than the snow cleat, which did not fit the shoepac and which continually worked loose in the steep terrain.

Suitable shoes and clothing must be worn if the tendency toward overheating during the strenuous movement and chilling during the "lying-in-wait" was to be overcome. The wool sweater and M 43 jacket without liner proved satisfactory. Clothing and shoes must not fit tightly as that impedes circulation during the long periods of lying inactive.

7. Equipment

The selection of weapons was important. Some regiments preferred the BAR, the sub machine gun, and the M-1 rifle. Care was taken not to burden down the men with

a lot of excessive ammunition or grenades. Keeping the weapons in working order was a problem. A small piece of cellophane was placed over the muzzle of a weapon to keep out snow and mud. A loose cloth over the working parts furnished protection in case a man slipped and fell in the mud or snow. Weapons were kept well oiled.

8. Communications

During a raid, communication between the patrol and higher headquarters was maintained by the use of phones, assault wire (W-130), and a relay point. The wire was reeled out as the patrol moved towards its objective. From this point fire was adjusted and reports on the patrol's activities were sent. By a series of knots tied in the wire at 100 yard intervals, the patrol in going out could estimate its nearness to its objective, regardless of visibility. The wire also prevented the patrol from becoming lost in its reorganization and return to our lines. The relay point was selected as near the objective as practicable to afford observation of as much of the enemy position as possible.

It was advisable to have an SCR-300 radio at the relay point in case the assault wire went out. However, radio was used only in emergencies. A code was used to inform higher headquarters of the routine progress of the patrol to its objective. A coded series of taps on the transmitter proved satisfactory.

As a means of communication, flares were used as a last resort. In firing them the location of the patrol was revealed to the enemy, and counterflare activity on the part of the enemy afforded a chance of misunderstanding and confusion.

9. Conclusions

Patrolling under winter conditions requires special equipment, and great physical endurance. Difficult terrain, confusing surroundings and bad weather are all time-consuming obstacles which must be considered when planning

a patrol action. Careful and detailed reconnaissances and preparations are essential.

16. Dissemination of Information

The dissemination of information by the G-2 report was SOP. The standard field manual form was used. Reports on the interrogation of PWs were attached to the G-2 Report. Reports were distributed by each unit to at least the two higher and lower echelons of its command as well as other interested parties. Army, for example, sent reports as low as division and as high as AFHQ. There were instances when a wider distribution was made. For example, it became SOP for Corps to disseminate their reports as high up as AFHQ. This was essential for the intelligence research conducted by that headquarters.

Specialized reports such as Counter Intelligence reports and Photo Interpretation summaries were disseminated mainly within and throughout their own channels. Reference to such dissemination is made in the articles on these specialized subjects.

Periodic Isums (Intelligence · Summaries) became SOP. They were brief summaries giving a picture of activities, identifications of prisoners, and prisoner statements. They were telephoned to the next higher headquarters three times daily at set hours by each unit. The telephone message was followed up by a radio message to insure receipt of the information.

Information of importance was passed on to the next higher headquarters as soon as it was received and evaluated. Later it was also included in the periodic Isum and G-2 Periodic Report.

The dissemination of information laterally and downwards was the responsibility of every unit. It was SOP to inform that unit first which could obtain the most value from a piece of information.

17. Psychological Warfare Branch

A. MISSION

The aims and objects of the Psychological Warfare Branch (PWB) fell into the categories of (a) Operational propaganda to the enemy and to Partisan groups supporting the Allies in the enemy's rear and (b) occupational propaganda to the population of liberated areas.

The first category included the dissemination of propaganda (a) to the enemy in order to subvert his morale and condition his thought to a desired state at a given time, and (b) to Partisans in order to obtain their support and encourage them in military operations.

The second category included the following:

a. Control and operation of the press and radio.

b. Collaboration with AMG and Allied Commissions.

c. Collection of political and propaganda intelligence.

d. Provision of an efficient news service to the Allied Command.

B. ORGANIZATION AND SUBSECTIONS

PWB AFHQ

:

PWB 15 Army Group

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<table>
<tr><td>PWB 5th Army</td><td>PWB 8th Army</td></tr>
<tr><td>Leaflets</td><td>Leaflets</td></tr>
<tr><td>Liaison with 22 TAC (Air dissemination)</td><td>Liaison with DAF (Air dissemination)</td></tr>
<tr><td>Intelligence</td><td>Intelligence</td></tr>
<tr><td>Mobile Printing</td><td>Mobile Printing</td></tr>
<tr><td>5 Army Radio</td><td>8 Army Radio</td></tr>
<tr><td>News and Monitoring</td><td>News and Monitoring</td></tr>
<tr><td>Interrogations (At Army cage)</td><td></td></tr>
</table>

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At Corps   *At Corps*

Liaison   Liaison

          Interrogations (At Corps Cage)

:

:

At Division   *At Division*

Cub Dissemination   Cub Dissemination

Loud-speaker Operations   Loud-speaker Operations

:

:

At Regiment and Bn.   *At Brigade and Bn.*

Shell Dissemination   Shell Dissemination

C. METHODS OF PROPAGANDA DISSEMINATION

1. Leaflets

Leaflets aimed at lowering the morale and will to resist of the enemy soldier were disseminated by means of

artillery shells and aircraft. They fell into three main categories:

      a. *Long Range strategical leaflets* such as the bi-weekly news sheet in German, ''Frontpost'', which kept the enemy informed of current events. ''Frontpost'' was written objectively with absolute accuracy of news but with a propaganda slant of presentation. Other general propaganda leaflets discussed the situation in Germany, e.g. News from Home, The Allied Aims, Post-War Europe and the Treatment of Prisoners of War. Strategical leaflets were aimed at the subversion of morale by the psychological presentation of incontrovertible facts based on enemy and Allied actions and events. Any important event or piece of news hurtful to the enemy was brought to his notice by means of latest news slips which contained a clear factual summary of news.

      Materiel from the Italian Combatte Radio program formed the basis of a weekly leaflet ''Italia Combatte'' (Italy Fights On) which was addressed to partisans and civilians in Northern Italy. It was disseminated by MAAF and also sent over with supply drops to the partisans. Special messages from the Army Group Commander also entered this category of leaflets.

      b. *Tactical Leaflets* designed to meet given tactical situations on Army, Corps, Divisional or lower formation sectors of the front. Just before the liberation of Rome and Florence a leaflet was addressed to the civilian population of both these cities instructing them in the name of the Commander in Chief to protect their town against the wanton destruction of the retiring enemy.

      c. *Safe Conduct Passes.* A psychological weapon to instil the idea of surrender in the minds of enemy soldiers.

      d. *Dissemination.*

      (1) Shell.

      Leaflets disseminated by 5th and 8th Army artillery were delivered from the presses to Base

Artillery Ammunition Supply Points where the leaflet rolls were inserted with a band slit into smoke shells whose cannisters had been removed. The shells were then transported to the gun positions by the Base Ordnance Service. Propaganda shells were fuzed to burst over the targets which had been selected. Many tests were carried out to determine range tables for more accurate firing. These tests proved very successful and our artillery was able to disseminate leaflets on pin point targets. The number of leaflets contained in a shell varied with the size and weight of the paper. Two different kinds of shells were used: the British 25 pdr. and the American 105-mm. The 25 pdr. contained 135 leaflets size 8" x 10" and 440 size 5" x 8". The 105-mm contained 230 leaflets size 8" x 10" and 750 size 5" x 8".

(2) Air.

The majority of leaflets disseminated by the fighters, fighter bombers, and light and medium bombers of MATAF were dropped in packets, though a small proportion were dropped by means of T.1 (M-26) bombs and from converted long-range fuel tanks. Packet leafletting was also carried out by cub planes (AOPs) and by heavy bombers of the 15th Air Force. Dissemination by bombs proved to be a most desirable method because of its accuracy.

A special weekly mission of 12 B-25 aircraft, carrying T.1 leaflet bombs, was allotted to 15 Army Group. This was a regular allotment of aircraft for use on targets selected by G-2, HQ 15th Army Group, and the mission carried the same priority as any bombing mission.

Leaflets in packets or in rolls for bombs were delivered to operational airfields by truck or transport aircraft. If the leaflet was addressed to some particular enemy unit, target areas were allotted by G-2 HQ 15th Army Group and passed to A-3 HQ MATAF who included the targets in his field orders.

During the period 11th Feb. to 10 March 45 the following dissemination was effected:

5th Army by shell, cub plane and XXII TAC	15,520,725
8th Army by shell, cub plane and DAF	19,526,600
57th Bomb Wing	13,699,350

2. Radio

a. *Italia Combatte.*

Italia Combatte Radio Program was the operational medium of disseminating propaganda to partisans and to the civilian population in enemy occupied territory. Italia Combatte was designed to work in conformity with the Allied operational program, and was broadcast daily. It included the operational instructions to partisans sent out in the name of the Commander, 15th Army Group, the daily patriot communique and special features and stories often written by the patriots themselves. This program proved to be of great value throughout liberated Italy. It was transmitted simultaneously by all civilian radio stations and cabled to London whence parts of it were rebroadcast by the Italian Service of the BBC.

Reports confirmed that Italia Combatte Radio was widely listened to on both sides of the line. Partisans reported that they followed carefully the instructions conveyed to them by this means. Another value of this program was the positive enemy reaction to the broadcast instructions. Even though it was not always possible for the Italian partisan to carry out all instructions given, the enemy frequently reacted as desired in answer to a specific broadcast.

b. *The Army Radios.*

PW interrogations revealed that the Allied Radio had a growing audience among German soldiers. Besides radio stations at BARI, PALERMO, ROME, and FLORENCE, both

Armies had their own Radio stations: Radio Fifth Army and the PWB Eighth Army Radio, both 1 kilowatt mobile transmitting plants.

News, commentaries and music were broadcast to the enemy. World news was sent to the radio stations from the PWB Central News and Monitoring Agency in Rome, while local news came either from G-2 at Army or from PWB correspondents in the field.

PWB Army Radio Stations operated not only for enemy troops but also for partisans. Recorded talks by partisans were used extensively and Army Radios conveyed instructions to civilians and partisans about given tactical situations, such as the course of action to be adopted on the liberation of a town, etc. As Allied troops were about to enter Rome, the Fifth Army Radio relayed instructions to the civilian population which responded by carrying out the Allied instructions. Besides broadcasting to the enemy, Radio Fifth Army brought programs to our troops at Anzio by re-broadcasts when other broadcasts were not reaching them.

3. Frontline Broadcasting

Loudspeaker units and equipment fitted to jeeps were used for this type of propaganda activity. News, propaganda items and recorded talks by PWs calling upon their comrades to follow them across the lines were broadcast to the enemy. Music was used as a preliminary to broadcasts to attract the attention of the enemy.

On one particular occasion, on the 22nd November, 1944, on the 92nd Division front, loudspeakers were set up 200 yards from an enemy stronghold. While instructions were broadcast both in Polish and German, the battalion commonder held his fire and then laid a smoke screen which lasted some 10 minutes and through which 6 PWs immediately deserted. A total of 25 deserters came in as a result of this particular loudspeaker broadcast during the next few hours.

Incidents of this description occurred frequently on both Army fronts. Although great numbers of deserters did

not come over as a direct result of front-line broadcasts, it is interesting to note that, whereas in the early days of loud-speaker broadcasts the enemy opened fire on our loudspeaker positions, later, fire was not brought to bear until the broadcasts were completed.

4. Basic News and Monitoring

"Basic News" was a summary of the latest news gathered from news agencies all over the world, and was distributed each morning to Army Group, Army, Corps and Divisional headquarters as well as to isolated units. It was produced at Army Group and at both Armies. The news contained was received in Morse Code overnight from the United Nations News Service in Rome.

A Monitoring Report of Allied and enemy broadcasts was also produced daily but its circulation was limited to those branches concerned with the materiel it contained.

5. Interrogation of PWs

As PWs came into the Army Cage, they were first interrogated by Army Interrogators on tactical matters and were then passed on to PWB interrogators, among others. The PWB interrogator was concerned mainly with:

a. *The evaluation of the enemy's morale* in the unit to which the PW belonged. (This information was co-related in periodical reports reviewing apparent changes in the enemy's morale. It was distributed outside the theater and compared with the evaluations made by SHAEF).

b. *The assessment of the enemy's reactions to Allied Propaganda.* It was important to know how many PWs saw Allied leaflets, what effect a leaflet had on their company or platoon, and whether or not these leaflets were read or passed on; and in case of deserters, whether or not their decision to come over to the Allied lines was motivated by a leaflet or an Allied broadcast. PWs were asked where they picked up particular leaflets dropped by aircraft, and PWB 15th Army Group then compared this information with the "nickeling" report

89

received from MATAF. In many cases, interrogation provided useful information on the accuracy of leaflet bombs, the effect of wind drift, and dropping techniques.

c. *The collection of materiel* for use in leaflets and broadcasts as well as general background and political information which was later passed on to AFHQ, other PWB Units, to the Foreign Office and the State Department.

6. Interrogation of Italian Civilians and Partisans

This was carried out by the Italian Intelligence Sections with PWB at Armies. Refugees and partisans were questioned after they crossed the lines. Political information on the towns that lay ahead of the Armies provided PWB with valuable targets such as radio stations, printing presses, location of German units, etc., and paved the way for the selection of suitable Italian personnel once the town had been liberated. Interrogation of Italian civilians also provided evidence of German atrocities which were passed on to AFHQ, and in certain cases made good stories for propaganda purposes in liberated areas. Partisans were also interrogated on their reaction to our propaganda and in particular to the "Italia Combatte" program.

7. Propaganda in Newly Liberated Areas

a. *Sound Trucks or Public Address Vans.*

Many loudspeaker trucks were used to tour the Army areas broadcasting the news and AMG announcements. Before broadcasting in any particular place the team contacted the local civil affairs officer for any special announcements he wanted made. In newly liberated places the teams worked closely both with AMG, with responsible army units in the area, and with the Provost Marshal. They acquainted the population with safeguards recommended by AMG, traffic regulations, curfew notices, etc. and brought the news-hungry populace up to date with world events. Later these loudspeaker units attempted to educate the population on such matters as

public health. In all cases they tried to establish a personal relationship. Seven loudspeaker vans operated with the 5th Army and three with the 8th Army. Programs started with the hymn "Piave". Banned by the Germans, this hymn often brought tears of joy to the large crowds which gathered round the trucks. In the interim period between the liberation of a town or village and the time when a newspaper could be established or received in sufficient quantities from a neighboring city, these loudspeaker vans provided the news and thereby, to a certain extent, controlled the sentiment of the population and counteracted the rumors and despondency often spread by enemy agents.

b. *Press and Publications.*

On the occupation of a liberated city or town all local newspapers were closed by PWB on behalf of the Allied Publications Board.

In the interim stage PWB published its own paper and wall news bulletins, which were followed later by authorized civilian publications.

PWB maintained control of newsprint and provided the news services for all papers in AMG territory.

In the 8th Army Area a bi-weekly Italian language newspaper the "Corriere Alleato" was produced from Feb., 1944. Its circulation varied between 6,000 and 20,000 copies per issue according to printing facilities.

c. *Propaganda Shops.*

Information centres were opened in the major towns. Photographs and maps of the various war fronts were exhibited from which the public could follow the daily development of the war. These propaganda shops were also the main distribution centers for American and British publications such as "Victory", "Il Mese", "Il Mondo Libero", etc.

d. *Films.*

Films were distributed within the 15th Army Group

Area by PWB. In areas of troop concentration where theaters were requisitioned for the entertainment of troops, efforts were made to reserve at least one theater for civilians in order to maintain their morale. A Weekly United Nations newsreel, prepared in London especially for Italy, was distributed to Italian theater owners. American and British films, either Italian spoken or with Italian sub-titles, were also distributed. In the Army Group area, shots of important events were taken by PWB cameramen for inclusion in newsreels.

D. FUNCTIONS

PWB at 15th Army Group operated as one unit responsible to PWB, AFHQ. PWB Combat Teams were attached to Fifth and Eighth Armies. A small Combat Team, PWB "F" Force, was established in the South of France for propaganda infiltration operations directed at Northwestern Italy.

1. Functions of PWB at Army Group

The main function of PWB at HQ 15th Army Group was that of Staff Liaison. Political and propaganda directives jointly produced by Political Warfare Executive and the Office of War Information were passed on to the Chief of Staff and heads of G-2, G-3, and G-5 for information. PWB was at the disposal of the Army Group Commander and his Staff for any tactical or strategical propaganda that was required. Liaison was kept with G-3 and G-5 regarding future operations in which PWB was to take part. The Army Group Staff was also kept informed of all PWB operations in the field and of their results.

2. Functions of PWB at Army

a. Leaflets.

Tactical Leaflets were written by the Combat Teams attached to Army. The information and intelligence necessary for the writing of such leaflets was gathered by the Combat Team Liaison Officers. The leaflet was worked out by

PWB who submitted it to G-2 and to the Chief of Staff for approval. Once approved, the leaflets were printed, rolled up and transported to the Base Artillery Ammunition Supply Point for loading and delivery to the gun positions.

It was also the function of PWB at Army to organize distribution of leaflets by cub pilots. This method however, was largely dependent on the weather. When the German Headquarters were at MONTELANICO, cub pilots at a height of 6,000 feet calculated wind drift and dropped leaflets on the town. When the Germans were pushed out three days later, thousands of leaflets were found in the main street. A new method of carrying leaflets by means of a converted airplane fuel tank attached to the bomb racks of fighter planes was devised by an officer of the Fifth Army Combat Team. During the period, September 1943 to March 1945, the Fifth Army Combat Team printed over 250 leaflets in German. During the months of November and December, 1944, over 10,000 propaganda shells were fired on the Fifth Army front each week as against 300 shells a month in the early days of the campaign.

b. *Printing.*

PWB Combat Teams were equipped with portable printing presses. During the drive up Italy the portable press proved invaluable in producing small late news leaflets for distribution by artillery observation planes on retreating German columns when artillery could not reach enemy locations by shellfire.

c. *News and Monitoring.*

As at Army Group, enemy and Allied news was monitored at Army and distributed at Army HQ and in the forward areas where "Basic News" was often the only newspaper received. PWB correspondents had the task of getting to the Italian public news of general propaganda value and other news of interest to them which they would not normally get on account of the absence of Italian correspondents in the Army Areas.

3. PWB Functions at Corps and Divisional Level

It was important that the commander of the battery which fired propaganda shells fully appreciated the operational value of particular leaflets. Therefore, PWB maintained liaison with all concerned from the Army level to the men who fired the shells.

Corps Liaison Officers working in closest collaboration with G-2 were responsible for all PWB activities at Corps.

18. Counter-Intelligence

1. Introduction

In general, the Italian Campaign bore out the soundness and efficacy of the principles of security and counter-intelligence laid down in military field manuals, and, with only a few exceptions, they proved to be comprehensive and to cover the subject adequately. Certain gaps, divergencies, developments and particular applications of these principles are noted below, covering the following:

a. Control of Civilian Movement.
b. Arrests and Internments.
c. Special Counter-Intelligence (SCI) Units.
d. Handling of Arrested Enemy Agents.
e. Relations with Civil Affairs.
f. Role of CIC/FSS.
g. Dissemination of CI Information.

The agencies which performed the counter-intelligence role were the American Counter-Intelligence Corps (CIC) and the British Field Security Survey (FSS). These agencies were controlled and administered by the American Counter-Intelligence headquarters (CI) and the British Counterpart called I (b).

2. Control of Civilian Movement

Very great attention was paid to the security control

of civilian movement, this proved to be the most important and valuable security measure applied by Counter Intelligence.

The first and most vital task was to insure that all refugees crossing the front line from enemy territory were screened. For this purpose Refugee Interrogation Posts (RIPs) were established at each Army PW cage. Persons crossing the lines were collected and sent back under escort (through PW channels) to the RIP, where they were subjected to a CI interrogation and search. They were disposed of through AMG refugee channels, or were detained, according to the result of the screening. The system was based on the co-operation of the forward troops, backed by a series of road check posts manned by Italian police and supervised by CIC/FSS.

All refugees arriving by sea and landing at ports or on the intervening coast-line were similarly screened.

Civilian movement within Allied occupied ITALY as a whole was also subject to control and restrictions. Liberated ITALY was divided into three zones for purposes of movement regulation.

The forward zone corresponded approximately to the Army areas. Within this zone a civilian could not travel more than ten kilometers from his domicile without a pass. Similarly no civilian could enter this zone from the rear without a pass. This restriction was enforced by means of numerous "snap" road-check posts, operated 24 hours a day, along the rear boundary of the zone. These were largely manned by civil police and supervised by CIC/FSS.

In rear of this forward or "Army Zone" was the second or "Restricted Zone." Within this zone, movement was free within each province, but a pass was required for inter-province travels. Similarly, a pass was required for entry into this zone from the rear. This restriction was enforced by means of "snap" check posts established at varying points throughout the zone, normally where roads crossed province boundaries.

In rear of the "Restricted Zone" was the "Free Zone", within which travel was unrestricted and no passes required.

The above restrictions were laid down by AMG proclamations. The passes were issued by AMG, (assisted by the civil police in the case of the Free Zone). Passes were normally issued at the point of departure. In the case of persons wishing to enter the Army Zone from the rear, their passes had to be obtained from the AMG authorities of the Army concerned, through the local AMG officer at the point of departure. Passes to enter the Army area were issued only to those persons whose journey was of direct benefit to the Allied war effort. Passes to enter into or to travel within the Restricted Zones were issued to any person who could show good and genuine business or domestic reasons for such travel. The names of applicants for passes were submitted to the nearest CIC/FSS for a check against the latter's records.

The above system worked well in ITALY. Though it was impossible to enforce the restrictions 100 per cent, it was possible to enforce them sufficiently to lead to the detection or discouragement of many enemy agents.

3. Arrests and Internments

Considerable confusion occurred at the beginning of the Italian campaign because adequate instructions regarding the disposal of persons arrested on security grounds or the establishment of civil internment camps were not included in our texts or initial plans. By the end of the Sicilian campaign, several hundred civilians were confined in various prisons throughout SICILY and in various PW camps both in SICILY and NORTH AFRICA. In a great many cases such persons were unaccompanied by any document showing why they had been arrested or who had arrested them, nor was there any central record showing the location of the persons who had been arrested.

Before the invasion of the Italian mainland, a fuller policy concerning the disposal of persons arrested for security reasons was formulated. The instructions clearly defined three different categories of persons liable to arrest on security

grounds, and the recording procedure to be followed on their arrests.

The three categories were:

a. Those who committed or were alleged to have committed, in the territory occupied by our forces, a security offence under international law or the provisions of AMG proclamations. These were placed in the nearest civil prison, charged with the offence as soon as possible, and tried by an AMG court.

b. Those who were not chargeable with a security offence, but who appeared on reasonable evidence to constitute a threat to the security of our military forces, operations, or military government, by virtue of their position, personality, sentiments or record. These were interned, i.e., treated as civil prisoners of war. As such, they were placed in the nearest PW cage and evacuated through PW channels to a PW Base Camp. (Note: no arrangement had yet been made for a special civil internment camp.)

c. Those against whom there was insufficient evidence to charge with an offence or to intern, but whom it was desirable, in the interests of security, to detain pending further investigation. These were placed temporarily in the nearest civil prison, and the security agency responsible for the arrest pursued the case and disposed of the detained person as quickly as possible either by release, internment or trial for a security offence.

In every case, a record of the arrest was made out by the arresting agency. This record or brief report contained information on the individual arrested, date and place of arrest, by whom arrested, reason for the arrest, and the category or classification (i.e., for offence, for internment, or for temporary detention). One copy of this arrest report accompanied the prisoner at all times and was handed over to the authority in charge of the prison or cage in which be was confined. One copy was sent through channels to Army Headquarters. The latter forwarded consolidated lists of such records bi-weekly to Army Group and to the appropriate AMG HQ.

In the case of internments, CIC/FSS was empowered to make arrests with a view to internment, but Army Headquarters was made responsible for officially authorizing such internments. If the Headquarters concerned did not approve the internment, it ordered the release of the person arrested.

The above-mentioned instructions clarified the procedure, which then worked smoothly. One serious weakness, however, still remained. The internees were located in various Base PW Camps in ITALY, SICILY and NORTH AFRICA, and this made it very difficult to arrange for the review of internment cases and for the release of those no longer deemed a danger to security.

This weakness was overcome in February 1944, when a civil internment camp was established in ITALY. From that date, all internees were evacuated to this camp, which enabled records to be centralized and reviews to be started. The administration of the internees was accepted as a G-1/A Branch responsibility, whereas the policy as to who would be interned and who released remained a G-2/GSI responsibility.

Review and release procedures were generally as follows. The interning authority (Army Headquarters) either authorized that the person concerned be interned for the duration of the war, or recommended that his internment be subject to review after a certain period, e.g., six months. In the latter event, the case was reviewed at the appropriate time by a board consisting of the commandant of the Internment Camp, an officer of the Allied Commission Security Branch, and a CI/I(b) officer. In the light of this review, the commandant was empowered either to release the internee or to have him continue in internment, without reference to the interning or higher authority. The cases of those interned for the duration of the war could be brought up for review at any time at the discretion of the commandant (or at the request of any other competent authority), but the internee could not be released without the approval of higher authority.

To assist the reviewing officers in their task, all

available information on the internees was forwarded to the commandant of the PW camp for his files. This included not only the brief arrest reports referred to above and the bi-weekly consolidated lists of approved internments submitted by the Army Headquarters, but also any other reports, dossiers, files, etc., in possession of the interning authority.

4. SCI (Special Counter-Intelligence) Units

SCI units were not covered by our military manuals, but they played an important part in the Italian campaign. There were four SCI units in Italy, three British units of MI-6 officers, and one American unit consisting of OSS(X2) personnel. They were under the command of AFHQ, but they maintained close liaison with Army Group and Army Headquarters, and worked in conjunction with CIC/FSS.

The duties of these SCI units were limited to matters directly affecting the enemy intelligence services and activities. They were responsible for undertaking the penetration of the enemy intelligence services, and, when occasion arose, for the special exploitation of captured enemy agents. They were not concerned with the enforcement or supervision of routine military and civil security measures. In short, they constituted a specialist counter-espionage service.

As a basis for their operations, these units maintained records containing more complete information concerning the enemy intelligence services, their organization and personalities, than those held by other Counter Intelligence offices or agencies.

When an enemy agent was captured, the nearest SCI officer was notified at once. The latter checked the agent's particulars against SCI records, questioned him (if circumstances permitted and interrogation was advisable), considered whether the agent could be exploited to our positive advantage, and advised Army Group as to his relative importance and proper disposition.

5. Handling of Arrested Enemy Agents

The procedure for handling captured enemy agents

was constantly adjusted and developed from the beginning of the campaign. Such agents were arrested on a scale hardly envisaged in the military manuals or in the planning phase.

In the earlier stages the numbers involved were sufficiently limited to enable each captured agent to be dealt with as an individual and special case which could be handled almost entirely by the counter-espionage specialists, namely the SCI units.

In the later stages of the campaign, however, the enemy's espionage effort increased to such an extent that the average monthly total of captured agents rose to over fifty. In these circumstances, the handling and interrogation of agents could no longer be dealt with by specialist CI agencies, and it became part of the normal work of CIC/FSS.

The following procedure was evolved. If an individual was detected or suspected as an enemy agent by personnel other than CIC/FSS, e.g., by our forward troops or by the civil police, he was immediately turned over to the nearest CIC Detachment/FSS Section. The latter then gave him a preliminary interrogation in order to extract from him the CI information of immediate interest, such as his mission, contacts, knowledge of other agents, etc. At the same time the nearest SCI unit was informed of the arrest. After this preliminary interrogation, the agent was lodged in a suitable jail, and a short report submitted by CIC/FSS to Army Group Headquarters, with a copy to the nearest SCI unit. The latter checked the agent's particulars against its special and extensive records. Normally an SCI officer then visited the agent, questioned him further, and considered whether the case was to be handled in any special manner. He then submitted a supplementary report, containing all additional information obtained, an apprecation of the significance of the case, and a recommendation as to the agent's disposal. If the agent appeared, on preliminary interrogation, to be of no particular interest or importance, the supplementary interrogation was sometimes carried out by CIC/FSS. If a full and detailed interrogation, conducted with the assistance of special devices, was required,

the agent was dispatched to Combined Service Detailed Interrogation Center (CSDIC), a subsection of CI.

The final disposal of the agent was decided by Army Group. If the agent required specialized treatment due to his importance, he was turned over to SCI. Otherwise he was brought to trial, if sufficient evidence was available to afford a reasonable chance of securing a conviction; if not, he was interned.

Two special difficulties were occasioned by the large number of agents who fell into our hands. The first concerned accommodation and segregation. It was impossible to segregate every captured agent properly during the period when he was being interrogated and awaiting trial. Although various special jails or sections thereof were taken over for security prisoners, it was seldom possible to obtain sufficient accommodation to allow for one cell per agent. Even when this was practicable, it was usually possible for prisoners in adjoining or opposite cells to talk to each other. This was highly undesirable from the point of view of enabling agents to concoct and confirm the same false story. In view of the numbers involved, this difficulty could not be overcome, and only very important agents could be properly segregated.

The second difficulty concerned the preparation of cases for trial. The intelligence aspect of a case differs considerable from the legal aspect. For example, the former is concerned primarily with what the agent knows, whereas the latter is concerned more with what he has done or how he has acted. From the intelligence point of view it was most important to interrogate the agent himself, whereas from the legal point of view it was important to question and to take statements from other persons by whom he was seen or who took part in his arrest. Moreover, CIC/FSS as a whole had little training in legal-police principles. It was necessary, therefore, for Security/CI agencies to accustom themselves gradually to the task of following up the intelligence and police or legal aspects of a case concurrently. It was found desirable to attach to each Army CI/I (b) staff an officer from the Allied

Commission Security Branch, with long police experience, to take care of the final preparation of trial cases for presentation to the AMG legal authorities. These officers were assisted by a small team of CIC/FSS personnel selected for their legal or police background.

6. Relations with Civil Affairs

It was laid down in the planning phase of the campaign that the military CI/I (b) staffs should be responsible for policy concerning all matters affecting the security of our military operations, forces and materiel. This included civil as well as military measures. This ruling was upheld throughout the campaign.

The Allied Commission had a small Security Branch, but it was concerned rather with politico-security matters, e.g., the political integrity of officials, and with security within the Allied Commission organization.

The actual issue of security orders and regulations to the civil population, as required by CI/I (b), was carried out through the Allied Commission. AMG was responsible for enforcing such regulations by means of the Italian police under their control. Offenders were tried in AMG courts. CIC/FSS supervised and advised on this enforcement under the direction of CI/I (b) staffs.

There tended to be a natural clash of interest between AMG and the security authorities. The main task of the former was to restore civil life to normalcy as rapidly as possible, whereas that of the latter was to maintain a strict security control of the civil population. Sometimes there was difficulty over the internment of key officials. In practice, however, no insuperable difficulties in this direction were encountered. Although the requirements of military security were always accepted as paramount, those of AMG were given careful consideration. It was usually possible to reach a compromise acceptable to both. An essential condition of satisfactory cooperation was that security agencies could not arrest civil

officials, except in emergency, without first consulting AMG or giving the latter due warning.

7. Role of CIC/FSS

The role of CIC/FSS turned out in practice to be rather more operative than advisory or supervisory, as was visualized in the manuals. This was particularly so in the case of FSS, who were required to work through the local police as far as possible, rather than with them. In ITALY both CIC and FSS operated to a large extent independently of the civil police. Actual arrests, investigations, interrogations, searches, "vetting" (processing) of applicants for travel permits and for work with Allied units, examination of hotel registers, participation in movement checks were all part of the routine work of the CIC/FSS, and formed the main bulk of their work. This change in function was necessitated by the mediocre quality of the civil police organizations.

It should be noted that, compared with the CIC, the FSS were not so well fitted by their original training to undertake such executive work, particularly in the sphere of investigation. They did, however, adapt themselves satisfactorily to this role. In this connection, it should be added that there was no essential difference between the CIC and the FSS. They both operated on the same general principles and in a similar manner. CI/I (b) instructions concerning the work of security agencies were issued by Army Group Headquarters in identical terms to both Fifth and Eighth Armies. There was one major difference in organization, in that CIC Detachments were graded in size according to whether they were assigned to a Division, Corps or Army, whereas FSS Sections were all of the same size. The former is considered the better alternative.

8. Dissemination of CI Information

It was convenient and practical to disseminate in the form of a standard bulletin all information concerning known or suspected enemy agents likely to be encountered in Allied

occupied ITALY. These bulletins were compiled at Army Group Headquarters and sufficient copies were issued for distribution down to CIC Sections and FSS Detachments. Bulletins were issued approximately every day, and the information contained therein was extracted mainly from interrogation reports on captured agents. They provided the following data: (a) Serial number; (b) Name and aliases; (c) Physical description; (d) Photo, if available; (e) When and where last seen; (f) Remarks.

In addition, a CI List, giving the name of all such known suspected agents was compiled at Army Group Headquarters printed in pocket book form, and distributed on the scale of one for every CIC agent/FSS Non-commissioned officer. The List contained only names and references to the CI Bulletin from which further particulars could be obtained. This List could be carried at all times and was very useful in checking names at road blocks, refugee centers, hotels, etc.

Lists of important CI targets in enemy occupied ITALY, which required immediate attention as soon as the area was overrun by our forces, were compiled at Army Group Headquarters. Both personality and building targets were included. The lists were issued shortly before the town or area concerned was likely to be reached by our advance.

Chapter Three

OPERATIONS
AND
TRAINING

OPERATIONS
AND
TRAINING

1.   Combined Staffs in the Italian Campaign

1. General

a. From the very start of the Italian Campaign the Allied Forces in Italy were comprised of a variety of nationalities which, as the campaign progressed, became more varied. To meet the natural tendency of each to follow its own style of staff procedure, it became necessary to develop a combined staff procedure. The complexity of the problems introduced by the differences in composition of the Allied Forces under control of the various headquarters necessitated the adoption of expedients designed to meet each general type of composition.

b. From its inception in 1943, the 15th Army Group Headquarters (known for a time as Headquarters Central Mediterranean Force and later as Headquarters Allied Armies in Italy) operated as a combined staff. Originally this headquarters, under a British commander, was both an operational and an administrative headquarters upon the British side, but only an operational headquarters on the U.S. side. British administrative procedure was utilized. In mid-December 1944, the Army Group was placed under an American commander, and its functions changed essentially to those of an operational headquarters only. As such, it exercised operational control over both the British Eighth and the U.S. Fifth Armies. A modified British internal administrative procedure was instituted.

c. The British Eighth Army, with command at various times over such dissimilar units as Polish, Greek, Italian and

Palestinian formations, as well as British troops, had a wealth of experience in adapting its staff procedure to fit the operational and administrative needs of so complex a fighting force. Similarly the U.S. Fifth Army controlled Brazilians, French Colonials, Italians, British Empire forces (such as South Africans, New Zealanders and Indians) and troops from the British Isles, as well as various types of American units.

d. Combined staffs had to be organized on Corps and Divisional levels. The U.S. VI Corps at the Anzio beachhead, the U.S. IV Corps during winter operations in the Gothic line, and the British 13 Corps at the battle of Cassino had extensive experience in operating with combined staffs.

2. Basic conceptions

a. Combined staffs during the Italian campaign were organized generally in four different ways:

(1) An integrated staff (e.g., the G-3 (G-Ops) Section of 15th Army Group Headquarters).

(2) An incremented staff (e.g., the Br. increment of Fifth Army Headquarters).

(3) A mission attached to a staff (e.g., the Fr. Mission with Fifth Army Headquarters).

(4) A liaison unit with a staff (e.g., the Br. Liaison Units with Italian Gruppi).

b. The method employed was determined by several factors: relative similarity in administrative and supply procedures; relative size and composition of staffs of subordinate units of respective nationalities; language similarities or dissimilarities; duration of operation requiring combined staffs; nationality of unit commander.

3. Integrated staffs

Completely integrated staffs are the most efficient and economical of time, personnel and equipment, provided:

a. The staffs speak a commonly-understood language;

b. The staff is substantially an operational staff (such as an Army Group or a Corps) rather than a staff which is also charged with supply and administrative matters (such as an Army or Division staff).

c. The war aims of the several nations are in complete accord;

d. The staffs are to function together for a sufficiently long time (say one year for the staff of a larger headquarters) to warrant integration, and,

e. The immediately subordinate unit troop lists are to remain substantially constant over a long period of time.

In the case of Allied forces other than British, whenever supplies come largely from United States sources, with the exception of minor specific national items which are supplied by the nation concerned, the integrated type of staff has been found practical. Examples of this type were the French G-4 and other special staff section members of the French Mission who were integrated and worked within, and as part of, their corresponding U.S. staff section. This was also true of the Italian officers who were integrated in the Fifth Army Staff Sections.

4. *Increments*

a. A staff with an increment of another nationality is more flexible and more workable when the size and composition of the lower units under command are apt to vary considerably from month to month or from phase to phase of the campaign, and when the administrative and supply procedures are sufficiently diverse to require separate treatment of G-1 and G-4 matters.

b. Where the supply source is entirely separate, as in the case of British formations operating under an American Army or Divisional headquarters, the utilization of an increment was found to be sound. The British Increment in the case of Fifth Army Headquarters always had personnel

sufficient to cover all branches, thereby making it an entity in itself. The various British staff members coordinated all matters with the U.S. opposite staff member, with policy matters being approved by the U.S. staff section chief concerned.

5. Missions

A mission attached to a staff is desirable when the foreign troops involved are relatively few in comparison with the overall troop strength, when there are language differences, and when the duration of the troop assignment or attachment might be short or undecided. In one instance a mission was retained even after withdrawal of all troops from command of the headquarters to which it was attached. Its purpose was primarily to handle all matters pertaining to nationals of its own country who resided or were found in areas taken during military operations by Allied Forces. In brief, it may be stated that the purpose of a mission is to furnish liaison between the headquarters to which attached and the nation from which detailed, and to attend to such affairs as are of no direct concern to the headquarters to which the mission is attached.

6. Liaison Units

A liaison unit attached to a staff is useful in cases of language differences, and when the size of the staff is relatively small, e.g., a British liaison Unit with an Italian Gruppi. Members of these Liaison Units are charged with coordinating the implementation of orders or instructions from the higher headquarters. Another example was the Allied Liaison Section with the Brazilian Expeditionary Force Headquarters.

2. Liaison

The standard system for providing liaison between units was used. However, it was noted that liaison officers were often selected for this duty from among those most conveniently available, rather than chosen from among those best qualified for the duty. As a result they were unfamiliar with the

importance and responsibilities of a liaison officer, and became merely messengers. It was proved advantageous to organize within the division a short school and to hold subsequent periodic conferences for the purpose of training efficient liaison officers.

In static situations, the liaison officer was often forgotten because the communication network was usually adequate.

Liaison with non-English speaking allies was not difficult above battalion level, for sufficient personnel could be found who could speak a common language. In lower levels, however, there were often difficulties, and, as a rule, such liaison was maintained only between flank contact parties.

3. Command Reconnaissance

The necessity for early, adequate, and continuous reconnaissance was amply demonstrated throughout the Italian campaigns. Division and assistant division commanders and regimental commanders habitually spent the greater part of their time with their front line units during offensive operations. Commanders of the higher echelons, divisions and corps, used the L 5 observation plane to familiarize themselves with their sectors, and supplemented this reconnaissance by map and aerial photograph study and by ground observation. Artillery observation planes were usually available to regimental and battalion commanders for reconnaissance of their own and adjacent sectors. Battalion commanders maintained an OP from which they could see their forward companies and the enemy positions. In most places reconnaissance forward of lines of departure was possible only at night since enemy observation was usually so well established that any movement in forward areas during daylight brought down effective enemy fire. In lower units command reconnaissance for an attack was generally carried out from the front lines of troops on position. When the troops on the position were to make an attack there was normally ample opportunity for all leaders to study the ground, their objectives, and the routes thereto. When the

units making the attack were to pass through troops on position, the leaders of the attacking units, down to and including squads, frequently spent two or three days and nights with the unit on position. In daylight and at night they studied the lay of the land, marked all critical points, and noted all important facts that might bear upon the intended operation.

In defensive situations, commanders accomplished their ground reconnaissance by using the OPs of lower units. Most division commanders visited their regimental and some of their battalion commanders daily; regimental and battalion commanders usually visited their company commanders as frequently; and company officers toured the squad and platoon positions continuously whenever enemy observation permitted.

4.   Air Cooperation

1. General

Normal direct air support for ground troops was coordinated by G-3 Army, A-3 Tactical Air Command, and the Army G-3 Air section. A meeting of representatives of these sections was held daily at which the intentions of the ground forces and their target requests for the following day were given to the Tactical Air Command. The Tactical Air Command made the final decision as to the targets which would be attacked and in what strength. They informed Army of the targets selected, and the time and type of attack, and Army in turn informed the subordinate units which had originated the requests. The normal channel for air requests not included in the daily air meeting was through Army G-3 Air to the Tactical Air Command. This normal procedure provided adequately for the attack of all targets during static situations and of some of the targets during offensive operations. A more expeditious system was used, however, for attacking "close-in" targets of an emergency or fleeting nature whose attack could not be prearranged as discussed above. This system was known as Rover Joe.

2. Air-Ground Coordination

The close air-ground coordination effected by Rover Joe permitted targets to be attacked with great speed and with little danger to friendly troops. The rapid production of photo maps enabled the pilots to carry photos of prearranged targets or mosaic photos of the target area with the bomb safety line drawn in with colored pencil. This safety line was designated by the infantry regiment. Front line troops did not use ground strips to indicate their front lines. Small units did not carry them as their infrequent need and doubtful value did not justify the added weight. Large permanent land mark letters were laid out on the ground as far forward as possible as an extra navigational aid. Successful experiments were made with red and yellow fluorescent panels.

Artillery smoke was used successfully in marking targets that were otherwise difficult to locate. To defeat the enemy's use of deceptive smoke, a system of patterns and colors was used. With his air request, the originator stated whether or not he could mark the target with smoke, and indicated the pattern and color combination peculiar to his artillery unit. The pilot, already briefed by Rover Joe as to the general target area, was called immediately before the smoke was due to fall and given the combination of pattern and color being used. Artillery smoke was sometimes used to mark the bomb safety line for extra close missions.

Vehicle markings were considered of doubtful value. The most reliable safety factor was the controller at Rover Joe who could either see both the planes and the front lines, or could be immediately contacted by jeep radio teams with the forward elements, to stop or divert attacks when necessary.

3. Air Blitz

Air Blitz consisted of a concentrated air bombardment of a strongly fortified objective by fighter bombers prior to its attack by ground forces. It was an attack in which all the air forces available combined to produce the greatest possible des-

truction in a given area for the sole purpose of aiding the advance on the ground. The objective was attacked with HE bombs, Fuel Tank Incendiary Bombs (FTIBs), and by strafing for a pre-arranged period after which concentrated artillery fire was put down to prevent the enemy from reinforcing the position while our forces moved in.

FTIBs were long range jettisonable fighter bomber gasoline tanks fitted to the bomb racks of P-47s. They were equipped with impact igniters and filled with gasoline and other inflammable materials which produced a sticky semi-liquid mixture. Troops were forced out of buildings, dug-outs and foxholes, which normally afforded protection against fragments and blasts from HE, by the burning mixture which flowed into them. The combination of FTIBs, HE, and strafing was very effective and had great demoralizing as well as casualty effect. Wooded areas were considered particularly good targets for this type of attack.

5. Combat Patrols

Infantry officers and enlisted men believe combat patrolling to be more hazardous than general attack. In view of this, it is increasingly important that the incurring of needless casualties be eliminated by the proper training, briefing, and equipping of patrols.

Combat patrols were used to enter the enemy lines to gain information, take prisoners, or take ground which our line failed to deny the enemy. Daylight patrols were used with success, but night patrolling was more common. Patrols consisted of a patrol leader and from four to thirty men. Too often, patrols were larger than the mission dictated. Officers led all important patrols. All members of combat patrols were usually selected from the same rifle platoon or squad. This method of selection was favored over picking individuals from several units of the company or battalion.

A typical combat patrol consisted of:

1 Officer or NCO - Patrol leader - Carbine or SMG.

1 NCO   - 2nd in command - Carbine or SMG.

1 or more other NCO's   - Carbine or SMG.

12 privates, armed with 4 SMG's; 2 BAR's; 6 M-1's.

All men carried two or more hand grenades; two of the men had grenade launchers with four grenades.

Bazookas were often carried for use against houses. Some units preferred more automatic weapons. One sixteen (16) man patrol was armed with ten BAR's and four SMG's.

Patrols that were briefed by officers back at the battalion CP were seldom successful. Patrol leaders were sometimes confused after the battalion CO, battalion S-2, and Rifle Company Commander each gave his instructions on what was to be done. The Battalion S-2 should himself be a successful patrol leader. He should compile all information possible and present it to the patrol leader in a clear and concise manner. In static situations much of his time should be spent working with patrols. He must see the patrol; he must talk with the patrol leader in person and not depend on a telephone conversation. Each man in a patrol should be given an opportunity to see the ground and objective beforehand if possible. Reconnaissance patrols by members of the combat patrol should precede all combat missions.

Initial briefing of a patrol should be made from 24-48 hours before its H-hour. When possible, a patrol should be given one day and night in the rear to prepare for its mission and conduct actual ''mock-up'' practice where each individual is trained for his part in the combat mission.

Battalion staff officers must arrange for supporting fires and notify all front line troops of the exact location and time of the patrol's departure and return. On its return, the Battalion S-2 or another staff officer should systematically interrogate each patrol and record all information.

''Professional'' patrols were used with varying degrees of success. In static situations they were employed more often and with greater success. The most successful ''professional'' patrols were made up of volunteers. Some regiments used

about two officers and forty men for this purpose. The Officers and NCO's lived with and cared for their men, trained, instructed, and kept them in condition. Good food, a place to rest in the rear, and some special privileges were usually given this group. These patrols were not usually sent out on ordinary missions. Some units reported that their ''professional'' patrols had never failed to accomplish their mission.

The action on the Italian winter line 1944-45 was dominated by numerous patrols. Most Infantry Commanders believed that greater attention should be given to the training of combat patrols and to the planning of their operations.

6. Combat in Cities and Towns

The larger towns and cities were not usually anchors or even important points in any of the strongly defended lines established by the Germans throughout Italy. Cassino, a notable exception, taught several lessons concerning the value of air and artillery bombardment in attacking such places. It was proved conclusively that a determined defender cannot be driven from a town or city constructed of stone by artillery or aerial bombardment alone.

There was little actual house-to-house fighting during the Italian campaign, and no city of any considerable size was captured by a house-to-house and street by street advance. Most of the divisions taking part in the offensive action in Italy captured many small towns and a considerable number of medium sized cities by first by-passing them, threatening their lines of supply and communication, and then occupying and mopping them up, after the enemy had withdrawn under the threat of encirclement.

During his delaying actions, and in some of his main defensive lines, the enemy occupied and stubbornly defended isolated houses, groups of buildings, and villages. As all Italian houses were constructed of stone or masonry and had walls from 12 to 30 inches thick, each building was in effect a natural fort. They afforded almost complete protection against

small arms fire and from shell fragments from mortar or artillery. All infantry units taking a part in the Allied advance between Salerno and the Gothic Line were often faced with the problem of capturing or overcoming resistance from such places. The methods they used were substantially those advocated by our manuals or some adaptation of those methods.

The actions involved in capturing a group of houses or a village usually followed a quite definite sequence and pattern. First, smoke was used to deny the enemy observation, and artillery employed to neutralize his defensive fires. Under this protective fire, the attackers maneuvered into positions permitting them to establish a base of fire with their automatic weapons and other small arms. Then, while their rifles, automatic rifles, and machine guns were firing directly into all exposed doors, windows and firing slits, bazooka teams and men with rifle grenades advanced and concentrated their fire on the windows and doors. When enemy resistance was sufficiently reduced the houses were assaulted individually by small groups, usually squads or half squads, who usually forced the enemy to surrender by throwing fragmentation grenades through the shattered windows and doors. Houses in a group were sometimes taken one by one and at other times assaulted simultaneously, depending upon the situation, size of the attacking force, and the nature of the resistance offered.

When they were available, tanks and tank destroyers were used to assist in the capture of groups of houses by placing direct fire upon them. Ordinarily when a house or group of houses was subjected to such direct, high velocity fire, the enemy either withdrew or surrendered.

7. *Assault of an Isolated Hill*

All the methods advocated by our field manuals dealing with offensive combat were used successfully in attacking isolated hill masses in Italy. Night attacks were used most often, and on the whole proved most successful. Both single and double envelopments were tried successfully on some

objectives. Daylight frontal attacks were attempted only when necessitated by action coordinated with other units. Frontal attack proved most costly and was the least successful method tried. Unsuccessful daylight attacks were on many occasions followed by successful night operations.

Infantry commanders learned that in attacking an isolated hill mass it was almost always best to do it the "hard way". The Germans always covered by fire all natural or easy routes to assault positions. Draws, ravines, roads or trails leading into their defensive positions were usually mined, wired with trip flares, and covered by registered fires of all supporting weapons. Our troops learned by costly experience that it was best to use the most difficult routes, to climb the steepest cliffs, or to move along narrow ridges, rather than to take the easy natural routes.

Daylight attacks proved successful against lightly defended objectives, and against strongly defended hill masses when adequately supported by tanks and artillery.

The tendency of some of our troops to stop, take cover, and dig in, when fired upon by small arms proved to be costly, and it required strong efforts by all commissioned and non-commissioned leaders to prevent the practice.

8. Night Attacks

In Italy, night attacks were launched against practically every type of objective. Infantry commanders generally preferred to make limited objective attacks at night as they usually received less mortar and artillery fire.

The limited trails and difficult approaches made night attacks difficult in mountains. Mine fields and steep cliffs added further difficulties to night attacks. Control and maintenance of direction were the greatest factors in night operations. If there was to be a change in direction, care had to be taken to see that all troops were warned.

Support and reserve units had to know where the attackers were at all times. Close liaison between reserve units and front

lines had to be maintained, as instances occurred where infantry reserve companies were committed at night and never reached the line of departure.

Intense artillery and mortar preparations alerted the enemy for the attacking infantry. Some units were able to slip into the enemy lines at night without the use of preparatory fires. Fire preparations were sometimes kept on call, and if needed, after the enemy was alerted, were fired as preparatory fires.

Night attacks were organized as simply as possible. Difficult maneuvers were avoided. However, regardless of the simplicity of the maneuver, plans were made in as complete detail as time permitted. Reconnaissance by as many leaders as possible was an invaluable aid.

Lack of coordination caused failures in night attacks. Adequate communication is imperative and alternate means must be provided. All units must know what is taking place, especially within the advance elements.

The time chosen to launch night attacks varied with the weather, length of approach, conduct of the enemy, size of the objective, hostile strength in men and armament, and other variable factors. The usual aim was to gain the objective and be ready for counterattack by daylight.

9. Rolling Barrages

Under good and aggressive leadership, well trained infantry followed 105mm rolling barrages at about 150 yards. However the usual distance was from 200-300 yards. The Germans often fired mortar and artillery concentrations on our troops during our rolling barrages in order to make it appear that our own artillery was falling short and thereby create confusion among our troops. At first some of our front line leaders requested that the barrage be lifted, thereby temporarily stopping the advance. This enemy trick was soon learned by all, and its demoralizing effect was considerably reduced. Due to the nature of the terrain the number of rolling barrages used on the Italian front were few. In some instances

it was found difficult to control a rolling barrage on steep slopes, and short rounds landed amongst our troops.

Our troops often moved up to a "Line of Departure" as close as 200 yards to the impact area of our artillery concentrations. This involved the same principle as following a rolling barrage, except that the infantry assaulted the enemy position as soon as the concentration was lifted. The British followed rolling barrages of 25 pounder shells as close as 150 yards since the back-spray and the concussion effect were not as great as those of 105mm shells.

10.   Employment of Tanks with Infantry

Tank units used with infantry were either attached to or in direct support of infantry regiments and battalions. The principle lesson learned from these infantry-tank operations was that considerable training in the joint operation of tanks and infantry troops is essential for smooth, efficient operation. Throughout the campaign, there were numerous instances where lack of coordinated action, confusion, and general lack of teamwork either caused the failure of the operation or prevented the fullest exploitation of advantages gained.

In a few instances where one tank unit was teamed with the same infantry regiment over a considerable period of time, both in training areas and in actual operation against the enemy, much better results were experienced. The infantry officers and non-commissioned officers became acquainted with and learned to appreciate the problems of the tank officers and men. Tank personnel likewise learned the problems of the infantry. SOPs were developed and various types of infantry-tank teamwork were devised. In their combined operations against the enemy there was little or no confusion, and no lack of coordination. The tanks knocked out enemy machine guns and overran defensive positions permitting the infantry to advance to objectives. The infantry in turn, lifted mines, outflanked enemy AT guns, and pointed out suitable targets for the tanks. When proper coordination was achieved, the

infantry-tank team was a powerful and effective striking force. The advantages of keeping the same tank battalion with one infantry division, and of having a particular tank company work habitually with each regiment was realized by all commanders of higher echelons. However, available tank units had to be used where they were most needed and where the terrain favored their use. Permanent attachment of tank battalions to divisions was therefore impossible.

Lack of means of communication between the infantry and tank units, or the failure of existing means of communication to work properly was the most important factor contributing to any lack of coordinated action. Although tanks units could usually maintain communications among themselves, they had no radio set capable of maintaining similar communication with the infantry unit they supported.

11. Employment of Mechanized Reconnaissance Units

The rapid advance to the Arno River after the capture of Rome presented a fast moving situation in which division reconnaissance troops played an important role. During those six weeks, reconnaissance elements were employed to gain and maintain contact with the enemy. However, reconnaissance troops were not employed in their normal roles when the situation became more or less static in the mountains. The following are some of the tasks for which reconnaissance troops were used under these conditions:

a. Defending a sector of the front line to relieve infantry.

b. Installing and covering road blocks.

c. Dismounted patrolling. Reconnaissance patrols were usually attached to front line infantry battalions. Some troops conducted motorized patrols with limited success.

d. Operating a battery of 50 caliber machine guns for indirect firing.

 e. Operating division OPs and radio relay stations.

 f. Clearing mined areas and maintaining roads.

 g. Mobile reserve. Some divisions did not commit their reconnaissance troops, but held them as a division reserve when all three regiments were committed.

12. Support of Mechanized Reconnaissance Units

 The support of reconnaissance squadrons by engineers, artillery, and medical personnel became standard procedure during the pursuit phase of the campaign. The mountainous nature of the Italian terrain; together with the inadequacy of the road net and the ever present demolitions, made engineer support necessary, and one platoon of engineers was attached to each squadron. To increase their striking power the squadrons were also supported by a battery of armored field artillery. Ambulances with their drivers were furnished by division medical battalions, and attached to the squadron to provide adeqate evacuation of casualities. Support by attached infantry or signal personnel was not considered necessary.

13. Defense of a Bald Hill

 The positions which the front line infantry held at the end of offensive actions usually became the main line of resistance during static or defensive operations. These positions did not always have the characteristics of good defensive positions but were held because future offensive action would necessitate retaking them. It was necessary at times to take up positions on hills devoid of any vegetation and affording no natural cover or concealment to our troops. The enemy usually had excellent observation over these positions.

 Normal entrenchments were prepared to defend these bald hills and their defence did not differ from that of other features. However, the nature of enemy activities permitted our infantry

commanders great freedom in the disposition of their troops. It became the usual practice when defending such features, to man the positions very lightly during daylight, having OPs covering all approaches, and only skeleton crews manning the crew served weapons. The remainder of the troops prepared positions on the reverse slope of the hill, out of hostile observation. These positions were prepared primarily to decrease the number of troops exposed to enemy mortar and artillery fire placed on the observed forward slopes. They also afforded the troops relatively comfortable living quarters. Rotation systems were used to permit all troops to spend part of their time in these rear positions. Most of the eating, sleeping, and care of weapons was done in these reverse slope positions.

At night, or when observation was limited by the weather, the forward positions were fully manned and work carried on to improve the foxhole or position of each soldier and weapon. When enemy activity increased, indicating a possible daylight attack, more forward positions were manned during the day, and if the attack materialized, the hill was defended from the forward slope. The positions organized on the reverse slope normally were not prepared for the defense of the hill. The use of reverse slope positions for defense was uncommon in this theater when the forward slope of the same feature was held by our troops.

14. Preparation of Defensive Fires

Infantry commanders realized the importance of preparing defensive fires for each objective prior to attacking it, in order to be completely prepared for the almost inevitable counterattack. This was done even if the objective was not a limited one.

The Infantry Battalion and Regimental Commanders indicated the fires they desired to have prepared to defend the objective, and then all weapons were assigned defensive fires.

Artillery defensive fires were planned in time for the fire direction center to prepare data. Upon reaching the objective, or before if possible, these prepared defensive fires were checked

by registration. These corrections were then recorded for the defensive fire data. It is very important that registration of defensive fires be made at the earliest opportunity.

15. Coordination of Antitank Defense

The mountainous terrain over which most of the operations in the Italian campaign were conducted made the extensive use of armor impractical and in many areas impossible. For this reason there was little or no coordination of antitank weapons provided or planned at division level during offensive operations.

In defensive situations, most divisions in their SOP made Division Artillery responsible for the coordination of all anti-tank defenses within the division. In most divisions the Division Artillery Executive Officer was the Antitank Officer, and was directly responsible for AT defenses. In other divisions the CG, Division Artillery was responsible, but in practically all cases the actual coordination was effected by the Artillery Executive Officer. In some cases this coordination was initiated by the division AT officer who estimated the requirements and placed his tank destroyers and tanks to cover the principal tank threats, after which the regimental and battalion anti-tank guns were used to supplement the TD's and tanks placed by division. It was far more common for the regiments to set up their own AT defense, submitting overlays of their positions to the division antitank officer, who then effected coordination by adjustment and by supplementing the defense with his TD's and tanks.

At regimental level coordination of all means of AT defense was effected through the Regimental Antitank Officer who was commanding officer of the antitank company. In general, in offensive operations where the nature of the terrain prevented the use of hostile armor, no coordination was considered necessary and none was effected. Occasionally AT guns were used successfully in initial stages of offensive actions, as assault guns, to penetrate stone houses, reduce pill boxes or bunkers, or

124

to thicken artillery preparations. More often in offensive action, AT guns were not used, and supporting TDs and tanks were used as assault weapons. In defensive situations, coordination of all AT weapons, organic or attached, was the responsibility of the AT officer and was accomplished in the manner prescribed by our manuals. Battalion AT guns were usually placed well forward to protect front line troops. Regimental guns were occasionally used with the outpost, but were usually placed in rear of battalion guns to give greater depth to the AT defense.

16. Fox Holes

The size, shape, and method of construction of the ''fighting hole'' varied from the standard prescribed in manuals to suit the existing tactical and terrain conditions. Provision was usually made to prevent surface water from draining into the holes. A sump hole in one corner was dug to collect water that did get in. Sandbags were of great value in stable positions. Within reasonable limits the individual soldier was allowed to exercise his own ingenuity in the preparation of his fighting hole.

Often a combination ''fighting and sleeping hole'' was constructed by enlarging the hole and covering a portion of it with earth and available supporting materiels. In defensive situations the two-man fox hole was used extensively. It was preferred to the one man fox hole for the following reasons:

a. It was more easily prepared. One man was able to protect the other while he was working.

b. It afforded relief and rest for the occupants. Men would take turns at being on the alert while the other slept or rested. Positions were effectively manned for longer periods of time.

c. If one soldier became a casualty the position was still occupied and did not cause a gap in the line. It also made possible the immediate application of first aid.

d. The psychological effect of the ''buddy'' system.

Under pressure, two men together encouraging each other would remain in position longer than one man alone.

    e. It afforded greater comfort especially in cold weather. Soldiers doubled-up on blankets and shelterhalves for extra warmth.

Various types of two man positions were used depending on the terrain. In mountainous or terraced terrain, digging laterally into the hillsides was used most often. On flat terrain the standard two man fox hole was prepared, and overhead cover provided whenever possible.

17. Digging in Flat Water-Logged Country

Experience of British troops operating in the Po Valley showed that digging in the usual sense in flat water-logged country is not feasible. No method was evolved to prevent fox holes and gun pits from filling with water in such circumstances, and a man who had stood some hours waist-deep in water became a liability rather than an asset.

Methods adopted to overcome this difficulty were:

    a. The use of river flood banks and any other banks or higher ground for the siting of slit trenches, fox holes, etc.

    b. The building up of defensive works above the ground level. This had the disadvantage of giving away defensive positions to the enemy and was only used where absolutely necessary.

    c. The formation of defensive strong points in houses which were strengthened for the purpose, and the construction round the houses of very shallow outpost positions which were occupied by night only.

18. Passive Air Defense

1. General

After the first stages of the operations in Italy, the Allies maintained complete superiority in the air. Enemy aircraft operated infrequently and then only in small numbers. Enemy air activity consisted for the most part of small raids

and reconnaissance sorties. Under these conditions our troops became careless in practicing the basic principles of passive air defense. This was especially true in rear areas. However, since forward positions were often subject to ground observation as well as air observation, the principles of passive air defense were more carefully applied there.

2. Enemy Practices

Our constant use of observation, fighter, and bomber planes made it necessary for the enemy to become masters of camouflage and concealment. A great deal was learned from their methods and practices, which were based on the principle that passive air defense was a responsibility of the individual soldier. Individuals were equipped with sniper and snow suits, ungarnished nets, helmet nets and occasionally paint. Individuals were trained to use special care in hiding litter such as tin cans and bits of paper, to provide camouflaged overhead cover for individual emplacements, and to remove excess earth from emplacements to concealed places. Excellent use was made of materials at hand in camouflaging installations from the view of aerial observers.

Movement was not allowed during daylight but was made only at night or on days which did not afford observation. German infantrymen were punished if they moved outside their holes during daylight. Night movements from camouflaged areas were made in small groups. Whenever possible, halts or rests were made only in areas of natural cover. At bridges, vehicles were detained in camouflaged areas and dispatched intermittently so as to avoid congestion. Railway flatcars loaded with military equipment or personnel were often furnished with square canvas covered frames so as to appear as boxcars. Various ruses, such as the preparation of false bridge crossing sites and the spacing of partly dimmed lights along roads to draw hostile aircraft away from movements in other sectors, were used in attempts to deceive our observers.

The defense against Allied strafing of enemy road traffic consisted of the following measures:

127

      a. A guard was placed on the outside of each vehicle to warn of approaching aircraft;

      b. At intervals of one kilometer along highways there were posted air-raid warning stations (Fliegerwarnposten) to signal approaching aircraft to motor vehicles;

      c. At intervals of óne hundred meters along important highways there were air-raid shelter trenches (Deckenloecher) in the shape of an "L" or a "V" for personnel traveling in vehicles. These were usually marked so as to be easily and quickly located;

      d. Vehicle shelters 17 feet long with walls 6 feet thick and a camouflage roofing were constructed.

      In defensive works the utmost use was made of natural camouflage which blended with the texture and color of the Italian landscape. Buildings were used to house pillboxes, and pillboxes were made to appear as houses, barns or outhouses. Much use was made of shrubbery and natural growth found in the vicinity, so that pillboxes and fortifications were often invisible or appeared to be stone walls on the hillside. Manure piles were known to have been used as camouflage for automatic weapon pits. Firing positions for artillery were usually located near roads or trails. Firing was withheld when Allied aircraft were in the vicinity so as not to reveal the gun positions.

      Much attention was paid to track discipline, although this was one of the enemy's weaker points. Emergency roads were sited close to ditches, the edges of fields, and the banks of lakes, rivers and creeks. Dummy emplacements were constructed and tracks made leading to them. Supply dumps were rarely more than one mile from a main road and under natural or improvised concealment. Vehicles were kept dispersed and allowed in supply areas only at night. Battered buildings were often used and vehicles and supplies dispersed among the ruins. Maximum use was made of shade for concealing weapons positions, tanks, vehicles, and supplies.

3. Allied Practices

Our artificial camouflage materiels were found both suitable and sufficient in kind and quantity. During the winter months many units painted artillery pieces and weapons white to blend with the snow. Engineers, by use of cloth, made large oil storage tanks appear as houses. Natural materiels found on hand were considered best for camouflaging and were put to maximum use. The basic principles of the enemy passive air defense and ours were similar. The enemy, however, through necessity practised them more thoroughly and painstakingly.

It was found best to keep command post installations away from large villas and sizable towns because these were usually the most suspected areas. Small farm houses proved most satisfactory for CP installations of regiments and lower units because of the existing trail net.

Effective passive air defense was gained only by proper training and supervision. It had to be constantly checked and improved. One of the best methods found for checking camouflage was the use of the cub plane by commanders to inspect their areas from the enemy observer's viewpoint.

Too much faith was placed in the concealment afforded by darkness. Night observation by aircraft, especially when the observer was familiar with the terrain, was very effective. Our use of artificial moonlight was an aid to their night observers. Even though darkness does assist in restricting observation, the principles of passive air defense should still be adhered to.

Radar warning systems were extensive and active on the entire front. Rear installations received sufficient warning of approaching enemy aircraft. However, due to the speed of aircraft and to radar range limitations, front line units seldom received prior warning of approaching aircraft by means other than visual observation.

In order to coordinate the efforts of both military and civilian organizations and the use of all resources, a

129

Passive Air Defense project was established. This project, known as PAD, was primarily intended for large areas of concentrated personnel and materiel such as base ports or areas in the communication zones. Its operation proved successful in reducing losses.

Most divisions, regiments and battalions appointed one officer as PAD officer. His duties were to coordinate all passive air defense measures. He checked camouflage, warning systems and dispersion in bivouac areas, and air guards on vehicles during motor movements, and worked in conjunction with S-2 on training in aircraft identification.

Light lines, at first kept well to the rear, were moved as far forward as effective enemy artillery range. It was found that the reduction of accidents and the speeding up of supplies and equipment justified the limited additional hazard of hostile air action.

19. Artificial Moonlight

After studies made of the British Eighth Army's experience with the use of anti-aircraft searchlights for night illumination, the Fifth Army made use of this development. Standard anti-aircraft searchlights were installed in selected positions so as to provide beams of light over the front lines. The illumination of an area thus lighted was similar to that of a full moon, particularly if the beams were reflected from and dispersed by a cloud layer.

Some of the advantages derived from the use of searchlights to produce artificial moonlight were the following:

a. Infantry night attacks were assisted by the better control facilitated by the light, and by the concealment provided by the shadows. Forward sides of buildings and brush being in the shadows could be utilized, as observation of troops in such locations was denied the enemy.

b. Keeping of direction was aided.

c. Enemy counter-attacks were spotted more easily.

d. Forward OPs were afforded better visibility.

e. Field artillery unit operations were facilitated particularly in servicing of the piece and in displacing to new positions.

f. Aid was afforded wire crews in laying and repairing lines.

g. Considerable assistance was afforded in the evacuation of casualties, and the fatigue of medical personnel was reduced.

h. Engineer operations, such as road maintenance and the building of bridges, were speeded up.

i. Movement of mule trains and troops was materially aided. Infantry reliefs were expedited and completed with less hazard.

j. Traffic on supply routes forward of the light line was speeded up to double that normally possible on dark nights. Many driving hazards were eliminated.

k. The supply rate of ammunition, gas, water, rations, etc., was stepped up because of the increased speed of traffic.

l. The fatigue of truck and tank drivers was reduced, and mechanics were aided considerably in motor maintenance.

m. Morale of troops was raised on cloudy rainy nights.

Following are some of the disadvantages and difficulties encountered, many of which were eliminated by changing beam directions or light positions.

a. In mountainous terrain, it was difficult to obtain light of fairly even intensity on all sections of roads. This proved to be a distinct disadvantage, in that drivers had particular difficulty along dark sections after having driven over a section of the road which was dimly lighted. This difficulty can of course be partially eliminated by using a greater number of lights if available.

b. The illumination adequate for an infantry attack was insufficient for extensive night tank operations in rugged terrain.

c. Some assistance was given the enemy in detecting our attacks and in withdrawal. However, the use of light was

131

controlled to give maximum advantage to our troops with a minimum of aid to the enemy.

　　d. It was not always possible to provide sufficient illumination to give the desired assistance to every operation being carried on in a combat sector forward of the light line. Fulfilling a request to aid one mission may interfere with another, and careful control was required to ensure maximum effective use of the lights available.

Army interrogators obtained expressions from PWs on our use of lights to ascertain the amount of assistance afforded the enemy and the operational interference created. These interrogations indicated that our use of artificial moonlight:

　　a. Facilitated movement of his troops on reverse slopes.

　　b. Restricted his movement on forward slopes, keeping troops pinned down, resulting in demoralization.

　　c. Facilitated his withdrawals in the face of attack.

　　d. Aided him in digging foxholes.

　　e. Permitted observation of our troops at greater distances.

　　f. Discouraged night desertions.

　　g. Restricted his motor movements.

　　h. Lowered his morale because it created a feeling that we were contemptuous of his capabilities.

　　i. Deprived front line troops of freedom of movement without observation on dark nights. They felt that they were seen, whether they actually were or not.

Three examples of the use of artificial moonlight in infantry operations are given below.

　　a. During a daylight attack an infantry battalion occupied a hill, and prepared for its defense for the night. At 0030 the next morning an enemy counter-attack was driven off, only to be followed by another and stronger counter-attack, which was also repelled, but with much difficulty, at 0145. As observation of the enemy's movements was very difficult, due to darkness, the battalion commander requested artificial

moonlight. In ten minutes time, a total of five beams provided sufficient light to enable the defenders to use their weapons advantageously and to follow the enemy infiltration attempts. At 0330 the enemy made a last desperate counter-attack which was also repelled. The visibility afforded by the artificial moonlight was a decisive factor in the successful defense of this hill.

b. Two infantry regiments had the mission of capturing a mountain height. Enemy resistance was stubborn, and the objective had not been gained by dark (1800 hours). One regimental commander requested indirect illumination of the crest and the town situated there. In a short time searchlight beams illuminated the area, and with the aid of this added visibility, the attack was pushed and the first elements were able to occupy the crest and the town at 1900 hours. Although preparations were made to repel any enemy counter-attacks, none were attempted either that night or thereafter. Continued use of indirect illumination greatly assisted OPs and sentries guarding against the approach of enemy patrols.

c. A large hill mass was the objective for a well planned night attack. From the line of departure two sharp but smaller ridges obscured the view of the objective on a dark night. A British battalion was ordered to make the attack on the night of October 28th. H hour was at 2230 hours. The moon set at 2315 hours, at which time it was planned to utilize artificial moonlight. The night was clear, no clouds obscured the moon, and full advantage was taken of this during the approach to the line of departure. At about 2300 hours the moon sank below a hill and the objective was completely obscured. A very great difference was immediately noticed, as one of the smaller ridges appeared to be the objective, it being the only feature visible immediately in front of the assault companies. On reaching the top of this smaller ridge, another similar ridge appeared immediately in front. This produced a bewildering effect as it was very difficult for units to determine their own location or the location of the objective. When the searchlights were switched on the objective was again clearly

visible and no further trouble was experienced by the battalion during the remainder of the operation. During the actual mopping up operations the artificial moonlight was also of considerable help as the assaulting troops were able to see the enemy trying to escape to the rear and fire was quickly brought to bear on them. In this operation the battalion took 59 prisoners, and suffered only 5 casualties.

20.   Direct Illumination of Targets

It was found that for artillery observation at night a target could be successfully lighted by direct searchlight illumination. The following illustrates an example of its use.

A house in enemy territory was known to be fortified, and was suspected of being a forward ammunition dump and distributing point. It was desired to place an observed concentration on this locality using direct light for observation about two hours after dark when the greatest number of enemy personnel would likely be present in the target area. A searchlight and generator were temporarily mounted in a 2½-ton truck. The distance from searchlight to target was five kilometers. The light was ordered into action at 2030 hours and out of action at 2050 hours. The objective was perfectly lighted and there was no need to adjust the searchlight beam. The objective was bracketed with two rounds, then immediately hit by a group concentration.

The success of the fire was due to:

a. The careful preparation made during the day; the officer of the searchlight company was taken to the Group OP and identified the target to be illuminated.

b. Excellent communications between firing unit and searchlight unit.

c. Good weather conditions (fogless night).

d. Efficient operation of firing unit and searchlight crew.

21. Indoctrination of New Units

Cadres of new units should be attached to units engaged with the enemy for battle experience. Duration of the attachment would depend upon the type of action taking place. In the defense from five to seven days should be sufficient. Members of one cadre during a defensive situation who spent fifteen days in the line felt that it was too long a period and that very little was learned after the first week.

The duration of attachments made during the offensive must depend upon the rapidity and character of the action. Three or four days may be sufficient in a rapidly progressing situation. In general, however, ten to fifteen days in most offensive situations should be satisfactory. Cadres should not be attached to units which have been in the line for too long a period of time immediately prior to the attachment; otherwise the poor technique, the lack of aggressiveness, the desire to ''get out'', and the lowered disciplinary standards which become prevalent in tired troops will be picked up by the new cadre as ''the way they do it in combat''.

A cadre, if not too large, does not add an appreciable burden to the front line unit. In fact it can be of assistance in staff work and patrolling. A battalion cadre consisting of the following proved to be appropriate for attachment from the viewpoint of both units:

Battalion Hq:
Bn. Commander or Bn. Executive Officer.
Bn. S-3.
Communications Officer or Sgt.
Wire Chief.
A & P Plat Ldr or Sgt.
S-1 or Sgt Major.
Each Rifle Company:
Company Commander or Co. Executive Officer.
One platoon leader or platoon sgt.
The Heavy Weapons Company:
Company Commander or Co. Executive Officer

One MG platoon leader or platoon Sgt.

Platoon leader and one section leader of 81mm mortar platoon.

22. Infantry Unit Training Centers

There is a definite need for theater infantry training centers designed for infantry units returning from the front lines, and for new units before entry into combat.

The object in so far as old units are concerned, would be to rebuild, train and refresh the small infantry units, with emphasis on perfection of team work; to amalgamate replacements into these units; and to develop and practise new ideas and lessons learned.

New units arriving in the theater would profit greatly by undergoing a course of training in such an Infantry Unit Training Center, prior to their first combat engagement. These new units might well undergo this training during the period when their cadres are receiving battle indoctrination with front line units.

Due to the short period probably available, the training effort should be concentrated on the use of weapons and on the technique of the small unit. Schedules should be made flexible enough to include training in weaknesses found in recent engagements.

Training programs should include the following:

a. Weapons.

(1) Zeroing of all weapons.

(2) Nomenclature, functioning of and familiarization firing with all infantry weapons (excluding the 37 mm and 57mm AT guns) for all personnel.

(3) Use of fire power—weapons capabilities.

b. Technique.

(1) Basic, Intermediate and Attack Battle Drill (progressive).

(2) Night Operations—Patrolling and attack.

(3) Problems—to consist larely of actual firing problems to stress technique, emphasizing the following:

(a) Determination of target locations by sound. (Crack and thump).

(b) Fire superiority—use of fire power and fire control.

(c) Small unit attacks—Squad and Platoon day and night attacks, fire and movement.

(d) Attack of a fortified strong-point (or area).

(e) Street fighting.

During time spent on problems not applicable to specialist personnel, training should be conducted in wire, SCR 300, etc., for communication personnel, mine training for A & P platoons and AT Co mine platoon, 50 cal. MG functioning and indirect fire for personnel using 50 cal. MGs, etc.

Instruction should include adjustment of artillery fire, infantry-tank teamwork, sniping, and the use of special equipment.

The advantages of such an Infantry Training Center include the following:

a. New material and lessons learned by others would be presented. Some platoon leaders felt that they had, through time, acquired the habit of thinking only along certain set lines, and that they and their platoons would welcome new viewpoints and suggestions.

b. The training centers would be equipped with ranges ready for use and equipped with suitable targets, markers, pits, etc. Available training time would be used to best advantage.

c. The previous planning, detailed schedules, problems and prepared areas set up and organized by the center would greatly aid battalion and regimental staffs and allow them some relief. Staff duties in rear areas were often more pressing and time absorbing than front line duty, consequently a member of a staff seldom had any relief.

d. Training would not lose team participation. The

137

training of the entire squad and platoon teams in the same principles and technique is imperative.

  e. Training would benefit by the presence of expert instructors, especially trained in subjects such as mines, street fighting, assault of pill boxes, sniping, etc. At least 75% of the instructors should be battle-experienced. The use of some instructors without battle experience is believed helpful in order that basic principles and theory not be forgotten. It often happens that battle experienced instructors say, ''We didn't do it that way, so the theory is wrong.''

23.   *Training in Rest Areas*

All units coming out of the lines for a rest period participated in some form of training program. Although much time and work was expended by the units, many felt that very little was actually accomplished.

Some units started a training program immediately upon closing in the rest area, while others had several days of complete rest and relaxation prior to starting their training. Both soldiers and officers undertook their training with much more enthusiasm when the latter method was followed.

Training consisted largely of range firing, small unit problems, combat firing, and drill and technical training on crew served weapons. Field training was unsatisfactory due to insufficient and unsuitable firing ranges and problem areas, and to a lack of training aids.

Planning for rest area training must be given a great deal of attention at higher headquarters. Liaison between higher headquarters and the training unit must be continuous, with a view to assisting to the maximum the training unit.

24.   *Infantry Conversion Training*

The manpower shortage was first felt in Italy during the summer of 1944 when insufficient infantry replacements were received to maintain the strength of infantry units fighting

there. To meet this situation, the Infantry Conversion Training Center was established to train as infantry replacements, soldiers of other branches and services who were fit for combat duty. The jobs of the men selected for training as infantry replacements were filled where necessary by limited assignment personnel available in the theater. The ICTC began operating in October 1944, and the first class of replacements was given eight weeks of training. After the graduation of this first class the period of training was extended to twelve weeks.

Men selected for conversion training were from all arms and services, and came from MTOUSA headquarters, PBS, Replacement Command headquarters, Air Corps service units, and the Adriatic Base Command. They were of all enlisted grades.

The ICTC was established along the lines of a Replacement Training Center in the Zone of the Interior, but was superimposed upon a standard Replacement Depot. It operated a number of companies of 300 men each. The training particularly emphasized weapons and tactics. Every trainee fired all the infantry weapons, including the crew served weapons, light and heavy machine guns, 60mm and 81mm mortars, and Bazookas. Every man participated in problems for squad, platoon, and company, usually taking a part commensurate with his grade.

At about the same time another conversion training problem was solved in another manner. During the summer of 1944, enemy air activity decreased to such an extent that not all the AAA units available were required for air defense. Some of these battalions were used as infantry during the Arno operations when they were grouped into various task forces. Later, after the situation became static, they were converted to infantry through a process of training conducted by Fifth Army. Selected company grade officers and non-commissioned officers were given infantry training at a Fifth Army training center. Upon completion of the training of these leaders, Army withdrew the battalions to training areas and gave them time to train as infantry units under their own officers, assisted by officers drawn from other infantry units.

Upon completion of their training, these battalions were grouped into, and activated as, an infantry regiment.

25. Schools

Most schools in the Italian theater were operated by the Replacement and Training Command, MTOUSA. They were designed principally for the specialist training of replacements and of personnel converted from one branch of the service to another. Vacancies existing after meeting these requirements were allotted by quotas to combat unit personnel for additional training and refreshing.

It was generally considered that the number of schools operated was sufficient. However, some units indicated their desire for a Driver and Maintenance School to which they could send selected individuals for training. The only school of this nature was operated for the Brazilian Expeditionary Force. Some units mentioned the need for a school to train potential 1st Sergeants. In combat, due to casualties among the best qualified NCOs, it was difficult to find replacements with sufficient technical knowledge to assume the duties of a 1st Sergeant. Some commanders expressed a need for a Scouting and Patrolling School, equipped to train an entire patrol as a group. In the absence of such a theater school, divisions operated their own scouting and patrolling schools when they considered it necessary.

Schools of a technical nature had need for only a limited number of battle experienced instructors. Schools that instructed in tactical subjects such as the Mountain Mobility School and the Leadership and Battle Training School required a majority of battle-experienced instructors.

The following were the most important schools maintained:

a. *The Officers Training School* established early in 1945 trained enlisted men selected from Infantry and other units, to prepare them for duty as infantry platoon leaders. Upon graduation after satisfactory completion of the course, students were commissioned second lieutenants and assigned

to infantry units. The course consisted of twelve weeks of infantry technique and tactics. Three classes of 100 men each were run concurrently, a new class arriving every four weeks.

b. *The Leadership and Battle Training School* was established to condition and train replacement officers, officers converted from other branches to infantry, and senior NCOs in battle conditions as found in this theater. A regular course of three weeks training was provided for company grade replacement officers. An additional three weeks' course was provided for company grade officers converted from other branches to Infantry. A three week combat appointment course prepared proven combat NCOs for responsibilities as officers, and senior replacement NCOs to perform their duties in combat. As they desired, newly arrived and newly organized combat units were allotted vacancies for company grade officers at this school.

c. *The Armored School* was designed for the refresher training of replacements and personnel converted from other branches to the Armored Force. It included three weeks' courses for crewmen of light and medium tanks and tank destroyers; six weeks' courses for crewmen of medium and light tanks and tank destroyers; and a three weeks' course for tank officers. Courses were scheduled as conditions warranted.

d. *The Photo Interpretation School* conducted individual specialized training in photo interpretation, particularly suited to fit the needs of division and higher unit, and artillery intelligence personnel.

e. *The Intelligence Training Center* was a development of the Photo Interpretation School, to fill the need for basic intelligence instruction for officers and NCOs from Infantry regiments and battalions.

f. *A Mountain Mobility School* was operated during the fall and winter months of 1944. This was a combined Anglo-American school. British equipment and instructors were used. Many students stated that the school was a good conditioning course, and that much was learned in the use of special mountain equipment. However, it was felt that the

course was not too practical because the specialized equipment used was not available in their respective units, and the nature of the front line terrain did not require this high degree of mountain schooling.

g. *The Engineer School,* organized to train individual specialists, was divided into two parts:

(1) The Bailey Bridge Course was designed for the training of Engineer replacements and Engineer unit personnel, both officers and EM. The twelve day course covered the use and construction of fixed and floating Bailey Bridges.

(2) The Mine Warfare and Demolition Course of twelve days duration was designed for unit and replacement officers and enlisted men on the basis of 40% infantry, 40% engineers, and 20% other branches. The length of the course and its scope were adequate. The school was neither large enough to allow all personnel of the infantry A and P platoons and AT company platoons to complete the course, nor to provide the desired number of mine trained specialists in artillery battalions.

h. *The Signal School,* primarily designed for replacements, was divided into courses covering message center procedure, radio operation and maintenance, teletypewriter operation and maintenance, telephone and telegraph, and a signal officers refresher course. The courses varied in time length, but were very complete in their scope and instruction. Because communication personnel were specially trained and difficulty was experienced in replacing them, commanders often felt unable to spare them from their duties to attend schools. This was especially true when units were in combat.

26. Traveling Training Teams

Traveling training teams were organized to meet specific needs or for specific purposes. For example, due to language difficulties, Portugese speaking personnel were used as teams to instruct the troops of the Brazilian Expeditionary Forces.

These training teams provided a satisfactory means for training limited groups of personnel in specialized subjects where only a general working knowledge was sufficient. In all cases the teams were organized from selected personnel of experienced units. They had the advantage of being versed in the newest developments, procedures, and lessons learned in their particular subjects. The teams were limited in size due to the lack of available instructors, and were therefore confined in their activities to lecture and demonstration methods. They were too small to conduct practical work with large numbers of troops. Training teams were not considered practicable for subjects that involved team work such as tactical problems for small units, because subjects of this nature require closely supervised practical work.

A training team instructing in mountain warfare operated in Division rest areas and later visited a few of the forward reserve units. Two engineer mine training teams were made available upon request to units desiring their assistance.

Instruction on combined infantry-tank operations was confined to joint infantry-tank staff and commander meetings. Training team instruction on this subject was considered impracticable, due to the large amount of closely supervised practical work necessary.

Demonstrations and instruction on the use and wearing of special winter clothing were excellent and offered many suggestions and methods that were put to immediate use.

The training teams on mine warfare proved very successful in instructing infantry units in a general knowledge of this subject. This training did not replace schools for personnel who needed specialized training in mines, such as battalion A & P platoons and AT Company mine platoons.

Additional subjects, such as personal hygiene, first aid, standardized procedures and expedients in Battalion and Regimental staff work, foreign weapons, and unit orientation could well be taught by traveling training teams.

27. Desirability of Training all Combat Infantry Men in use of all Infantry Weapons

It was found in combat operations that men lacked sufficient knowledge of weapons other than the one with which they were armed. In particular, a general lack of familiarity with the Bazooka, rifle grenade and BAR was prevalent. On occasions squads were without a BAR due to casualties and the lack of ability of other members of the squad to take over and man the weapon.

Some unit commanders felt that in a rifle company, the men of a platoon should be trained only in the weapons (both crew served and individual) of that particular type of platoon. Their argument was based on their experience that rarely did they transfer personel from a weapons platoon to a rifle platoon and vice versa.

Others felt that all personnel in a rifle company should receive training in all weapons of the company. In their experience, due to numerous casualties in their weapons platoons, it was necessary at times to use rifle platoon personnel to man crew-served weapons. Inasmuch as this personnel had not been trained on crew-served weapons they could be used in the weapons platoon only as ammunition carriers. All agreed that transfers from the weapons platoon to rifle platoons were rare.

The majority stated that the men of Heavy Weapons Companies should be trained in all weapons of the company, based on experienced needs for transferring personnel between the company platoons. Some added that training should include the LMG as this weapon was often used in place of the HMG by Heavy Weapons Companies in difficult moutainous terrain.

The most generally expressed opinion was that all infantrymen should be given a suitable familiarization course in all infantry weapons with the exception of the 37 and 57mm AT guns. The familiarization courses fired during their training

period by units serving in this theater, were considered generally unsatisfactory. Courses should include functioning, assembly, disassembly, and sufficient firing to insure that the individual can satisfactorily fire any infantry weapon when the necessity arises. Due to the similarity between light and heavy machine guns and between 60mm and 81mm mortars, familiarization with the light weapons should be sufficient for rifle company personnel.

28. Marksmanship Courses

Most officers and non-commissioned officers were satisfied that the training in marksmanship which our troops received was sound and practical. It made good shots of average soldiers and provided a sound foundation for firing on the transition range and for combat firing. They felt that this basic training in marksmanship was essential to give the soldier confidence in his rifle and in his own ability. Opinion was unanimous that more time and emphasis must be given to firing at field targets. It was also pointed out that although our training had made soldiers proficient at hitting targets that they could see, it had not emphasized the importance of, or the necessity for picking out and firing at probable targets in areas from which they were receiving enemy fire. They felt that more field firing conducted under conditions approximating as closely as possible actual battle situations was essential, and that, if necessary some time might well be taken from that allotted to preliminary marksmanship and known distance range firing to provide the increase in time for combat firing. Most of them felt that the combat reaction or close combat courses afforded valuable training but that hip and snap shooting should be further stressed because of their value particularly in patrolling. It was agreed that the rifle marksmanship course should be completed by all infantry soldiers before they started training in other weapons.

Detailed comments on the marksmanship training for different weapons follow:

145

a. *Rifle.*

Few suggestions were offered as improvements for the course in rifle marksmanship and no great number concurred in any of the suggestions. A few thought that training in the standing position was a waste of time, since this position was seldom used in combat, while others pointed out that particularly in patrolling our soldiers frequently had to use the off-hand position. Some said that our training should be conducted without the use of the sling since it was seldom used in battle. Others said that the use of the sling in marksmanship training helped make the soldier a better shot and thus increased his confidence both in his rifle and in his own ability. They thought that the sling should be used in known distance firing and that training on the transition range and in combat firing should be conducted both with and without the use of the sling.

b. *BAR.*

All agreed that the marksmanship course for the Browning automatic rifle was excellent. All of the positions taught were used habitually in combat. A few thought that more training in assault fire or marching fire should be included in the BAR training. It was agreed that all infantry soldiers should be thoroughly trained in the use of this important weapon.

c. *Machine Gun.*

Marksmanship training in this weapon was believed to be sound and generally satisfactory. Many thought that 1000 inch firing should be repeated frequently during training periods of combat troops. Training in assembly and disassembly should be initially thorough and should be repeated often enough during the training period to ensure complete familiarity with this important phase of MG instruction. The inclusion of Field Firing in MG marksmanship courses corrected the only deficiency noted by combat infantrymen. Training Circular Number 6, published 8 February

1945 added instruction in firing at field targets and record firing at targets spaced irregularly in width and depth at ranges varying from 400 to 800 yards.

29. Partisan Activities

Even before the invasion of the Italian Penisula, the Allied Armies knew that they could expect considerable assistance from civilians behind the enemy lines. The Partisan movement was an expression of Anti-Fascist and Anti-German opinion. The strength of the movement stemmed from the existence of bands of ex-Italian Army personnel, and of political organizations that had developed underground during the Fascist regime. These bands and groups were united neither in political philosophy nor in their post war aims, but were drawn together by their intense desire to see the complete collapse of Fascism and the route of all German forces from their country. How to utilize this force and develop it into a valuable military asset was the problem confronting the Commander of the Allied Armies in Italy. Little was known during the winter of 1943/1944 of the number, the location, or the activities of partisan groups, but some information did come in to headquarters of the Allied Armies in Italy confirming their existence and some of their accomplishments.

The Partisans had developed two separate types of organization. In the mountains surrounding the flat lands of the Po Valley, numerous bands, principally former soldiers of the ex-Italian army but augmented considerably by young men anxious to avoid forced labor in Germany and led by former officers or non-commissioned officers of the Italian Army, gathered together in remote districts where they seized control and operated more or less openly. These groups were frequently joined by deserters from the German Army, Russians, Poles, Czechs, Slavs, and Alsatians, and by American airmen, British, Indian, South African, Canadian, New Zealand, and French officers and men who had escaped from Italian prison camps. By the end of 1944 most of the mountainous districts

of Northern Italy were controlled by such bands and the Germans controlled only the principal routes of supply and communication in these regions. In the Po Valley, the Partisans, being unable to operate openly, formed clandestine groups in an underground movement. Frequently these individuals worked for the Germans during the day while planning and executing various acts of sabotage during the night. Many railway and factory workers were of this type.

The Italian Partisans never had an effective central headquarters dictating their military actions and policies. A central committee known as the CLNAI was organized at the top of a pyramidal structure consisting of regional, provincial, and city committees, but confined its activities to managing finance, coordinating intelligence matters and appointing certain leaders. The efforts of the individual bands were coordinated directly through the special operations branch of 15th Army Group.

When the Partisan movement emerged as a fighting force, the Allies began to supply them with arms and equipment, principally by air. Started late in 1943, this supply was increased throughout 1944 during which time many thousands of tons of various classes of military supplies were received by Partisans bands. Shortages in supplies and lack of means of communication were the chief factors limiting the activities of the guerillas.

Allied missions consisting at first only of Italian personnel were placed with the Partisans as early as January 1944, and in the spring Allied personnel, both British and American, were sent not only to carry them operation instructions and radio sets, but to train and work with them in carrying out assigned tasks. These missions were sent out regularly during the latter part of 1944. They were successful in establishing communication with and giving directions and training to many of the larger bands of partisans. Some missions were in reality task forces, consisting of two officers and from ten to thirty men. They were heavily armed groups of particularly adventurous soldiers from any of the allied armies who para-

chuted into enemy territory and there, either with some partisan organization or alone, carried out some vital act of demolition or sabotage. Upon the completion of their principal mission, these men joined or continued to work with the Partisans.

The number of persons engaged in subversive work, sabotage, or in actual fighting was always difficult to estimate. Up to the close of 1943 it probably was only a few thousand. With the increasing allied assistance provided during 1944, the existing bands grew in numbers and new groups were organized. The number reached its maximum in the fall of 1944 when it was estimated that there were 120,000 active armed men. During the winter of 1944-45 the number was probably reduced by half, since winter weather did not permit our large scale air supply activities to continue. Many bands reduced their size and others disbanded altogether. With the advent of spring in 1945, large scale air supply and an increase in the number of Allied Missions again caused an increase in the number of Partisans.

The value of Partisan activities to the Allies can only be estimated, and an accurate report of their results will never be possible. They, nevertheless, accomplished a great deal concerning which we received accurate information, some of it confirmed by prisoners of war and by the reports of our agents. It is certain that the accomplishments of Partisans formed a vital contribution toward the success of the Italian Campaign. Their achievements included:

a. Casualties caused the enemy. Accurate confirmed reports listed several thousand enemy soldiers killed, wounded, and captured.

b. Sabotage. Trains were derailed and many locomotives destroyed. Motor convoys were destroyed or captured. railroads were cut, bridges blown, highways obstructed by demolition, factories demolished and many tons of military supplies destroyed.

c. Diversion of enemy effort and effect on morale. The presence of the powerful Partisan groups behind the enemy lines certainly diverted a considerable portion of the enemy's

attention and effort from his principal task of dealing with the allied armies on his front.

d. Value to Allied Intelligence. Allied agents behind the enemy lines took advantage of much information collected by Partisans. In addition these groups furnished safe refuge to our agents from which they could conduct their work.

e. Help to Allied Ex-PW and grounded airmen. Although we cannot determine the figures, we do know that, through the assistance of Partisans, a great many grounded air crews and escaped PWs returned to Allied territory.

f. Stimulus given to Enemy Desertion. It was determined by the interrogation of large numbers of enemy deserters that Partisans actively encouraged and organized desertion. This activity was most effective among Italian and Volksdeutch troops but to some extent also brought about German desertions.

g. Cooperation with forward troops. All troop units fighting in Northern Italy vouched for the assistance rendered them by the Partisans, who furnished them guides during offensive operations, collected information concerning minefields and troop dispositions, and on occasions prevented extensive demolitions by the enemy. During the April 1945 drive across the Po Valley their contributions were enormous. In a period of less than ten days they captured before the arrival of our troops, a large number of cities, among which were Massa and Genoa on the west coast, Parma, Bergamo, Milan, and Venice in the Po Valley. During these operations they captured over 25,000 enemy troops and assisted our advancing forces in capturing as many more. The speed and success with which the conquest of Northern Italy was accomplished was aided materielly by the assistance of the patriots working generally behind the enemy's lines.

h. In every city captured by the Partisans the CLN took over the civil administration, decreed curfews, controlled food distribution, prevented rioting and looting, and in general preserved order until AMG officials arrived to take over a city government already well established.

30. Task Forces

Task forces were organized during the Italian campaigns to accomplish two general missions: to assist in the exploitation and pursuit of the enemy after his main line of defense was broken; and to relieve infantry units which were needed for more important tasks.

In the transition from normal offensive action to pursuit operations, a number of pursuit task forces were organized and committed. These generally consisted of small, flexible, mobile, and hard hitting forces composed of the several ground force arms. They were usually self-contained and self-sustaining. The composition and formation of these forces varied with the mission to be performed, the terrain over which they operated, the units available for employment, and with the nature of the enemy action in the sector where they were used. In some instances they were used for reconnaissances in force, to locate the enemy retreating forces after contact had been broken. In others they were organized to destroy enemy delaying forces and to bring pressure on the main withdrawing force. In still other cases they were dispatched to cut off and destroy elements of the enemy seeking to escape. In all situations, speed, mobility, and fire power to meet the existing situations were the main considerations in the composition and use of these pursuit task forces. Pursuit forces generally consisted of elements of mechanized reconnaissance, engineers, tanks, tank destroyers and mobile infantry. The proportions naturally varied with the mission and the terrain.

One successful combination consisted of the following:

Reconnaissance platoon
Light tank company
Medium tank company
Infantry company
Engineer platoon
Tank destroyer platoon

Excellent results were obtained by employing two of these small forces on each road or avenue of advance. Some units found that the inclusion of a section of engineers equipped with mine detectors and a bulldozer in a pursuit task force was of material assistance.

Task Force "H" was organized as a pursuit force on several occasions to pursue the enemy with strong mobile forces. On one occasion the force comprised the following:

      Headquarters of an armored regiment

      Two Battalions of armored infantry

      Battalion of infantry

      Battalion of tank destroyers

      Battalion of armored field artillery

      Company of armored engineers

The commanders of pursuit task forces were chosen for their aggressiveness and knowledge of the immediate situation. It was learned that the use of an already functioning staff which could be used solely for the task force greatly assisted the commander in the employment of the various units of his force.

An important factor in the employment of these pursuit forces was the proper internal organization to permit immediate deployment and flanking movement when resistance and delaying forces were met. It was essential that a part of the unit be prepared to enter into a firefight as soon as fired upon. By keeping a fully organized force prepared to pass through a leading force which had deployed, the advance was maintained at a steady, unbroken rate.

The occasion for organizing another type of task force developed from a shortage of infantry units. There were available a number of units of other arms capable of being grouped into fighting forces. These units were organized into combat groups and were employed successfully during offensive actions and during static operations in place of infantry units. Typical forces of this type were Task Force "R" and Task Force 45.

Task Force "R" was organized several times during

offensive operations to take over sectors that ordinarily would have been assigned to infantry units. This force was formed primarily from armored units with a minimum of infantry included. The size and composition of the task force changed from time to time because of the necessary regrouping of units. At one time it contained the following:

> Headquarters, armored group
> Reconnaissance battalion
> Armored field artillery battalion
> Armored engineer company
> Tank destroyer company
> Infantry battalion

It was employed several times to fill a wide lateral gap between the American forces and the French. On one occasion its mission was to advance in its sector on the right flank of its Corps, protecting the flank, and maintaining contact with the French forces.

Task Force 45 was organized to relieve infantry units which were in contact with the enemy in a static situation. The infantry units needed rest and training for future operations, and other organic infantry troops were not available to relieve them. There were present in the theater several Anti-Aircraft Artillery (AAA) battalions which were not needed for their anti-aircraft role, since enemy air activity had practically ceased. With a minimum of training in the basic infantry weapons, these AAA battalions were formed with other troops into a task force which relieved organic infantry.

Since the work laid out for this task force was that of ordinary infantry, the AAA battalions were formed into small combat units similar to squads and platoons of infantry. Three batteries were reorganized as rifle companies. The fourth battery in the battalion became a heavy weapons company. The rifle companies had four platoons each made up of two former 15-man gun sections. Training was directed by experienced infantry officers attached for that purpose. Initial training before relieving the regular infantry units was as short as two days in some cases, but training in the basic infantry fundamentals was continued on the front lines.

31. Rotation of Units and Individuals on Front Line Duty

In the winter of 1944-1945 defensive positions were maintained high in the Apennine mountains, in snow, rain and mud. Units were subjected for long periods to the hazards of both weather and enemy action. It was necessary that everything possible be done to provide for the physical and mental comfort of the front line soldier.

Constant attention was given to the improvement of all positions. Waterproofing, heating, overhead cover and sand-bagging were accomplished as much as possible. In many cases it was possible to establish positions on reverse slopes and to maintain the forward positions by using only skeleton forces during the daylight hours. Reverse slope positions usually consisted of bunkers housing approximately six to eight men in each. This allowed rest and some relaxation during the day. Personnel of the skeleton force was changed from day to day.

Due to long periods on the line, hard rations became very tiresome. Wherever possible kitchens were broken down into separate stove units and ''B'' rations fed to front line platoons. Where this was not possible rations were varied from day to day between the new type C and the 10 in 1. These were also supplemented with bread, coffee, cream and sugar. In some cases fresh fruit and jams were taken from rear area troops using ''B'' rations and sent to front line soldiers. Units found it difficult to maintain a suitable supply of squad burners so canned heat also had to be used.

Many battalions established facilities in their rear areas where men were fed hot ''B'' rations, given showers, clean clothes, books to read, writing material and post exchange rations. When possible, front line individuals or small units were rotated to enable all to take advantage of these facilities about every ten days. As the tactical situation permitted, front line individuals were sent to division and Army rest centers

for four to six day periods. The front line fox hole soldier was given priority in this rest center policy.

Many units established laundry facilities so that individuals periodically were able to obtain clean clothes and socks.

Tactical operations seldom imposed equal hazards and hardships on all platoons or all companies alike. Consequently, it was general practice to rotate platoons each three to five days and companies each seven to ten days. The average change over time for battalions was between fifteen and twenty-five days providing all battalions of a regiment were not committed.

On particularly hazardous duties such as patrolling, individuals were constantly rotated, so that a man seldom went on more than one or two patrols a month.

Many regiments and divisions established reception and rehabilitation centers. These were principally designed for the medical supervision and rehabilitation of men returning from hospitals.

32. Desirability of Organic Armored Battalions in the Infantry Division

Conferences of appropriate commanders were held to determine the relative advantages and disadvantages of making armor an organic part of the infantry division. Combat commanders could not reach any general agreement concerning the matter. Some of them wanted tanks and tank destroyers included in the division, others desired only organic tank destroyer battalions, while still others wished to continue the standard practice of attaching all armor.

Those who favored making armor an organic part of the infantry division cited the fact that combined training of armor and infantry was essential to successful operations. Such training would be facilitated if tank and tank destroyer battalions were organically included in the infantry divisions instead of their being attached as separate battalions, as it had been rarely possible to provide combined training with

separate units. Infantry commanders on regimental and battalion levels would be provided a greater opportunity for the study and use of the armored weapons, and therefore could more easily take advantage of their capabilities. Difficulties in infantry-armor teamwork which resulted from misunderstandings between infantry and armor commanders would be eliminated by the intimate personal contacts gained through training and living together. The close cooperation achieved in the infantry-artillery teams could be attained within the infantry-armor teams if both elements were comprised in the same organization. Communications and administration as well as supervision, training, and employment would be greatly facilitated if the infantry divisions contained organic armored battalions.

Those who opposed making armor a part of the infantry division contended that a more economical disposition of armor could be attained under the system of attaching all armor, since at times some divisions operated over terrain unsuitable for armor while others were in sectors where armor could be employed. The separate battalions were attached to divisions operating in sectors where they were needed, which at times resulted in grouping several battalions with one division while others operated without armor. In considering only tank destroyer battalions, their need as anti-tank weapons was dictated by the tank threat, which in turn was influenced by the terrain. Certain conditions of terrain and the absence of tank threats created periods in which TD battalions were useless in their primary role and could be utilized only as supporting artillery. This condition favored maintaining the practice of having separate TD battalions which could be attached to a division whenever the tank threat warranted. Including armor as a part of the infantry division would greatly aggravate the problems of mechanical maintenance within the division and would necessitate the augmentation of division ordnance.

In considering changes in the size and composition of the infantry division, additions other than armor were considered more important. The inclusion of armor in the division in

addition to these might tend to make the division too large and unwieldy, due to the increased problems of supply and administration.

Since the disadvantages connected with the making of armor an organic part of the division seemed to outweigh the advantages to be gained, recommendations from Fifth Army and from Fifteenth Army Group were that tanks and TD's be not included in the T/O and T/E of the infantry division.

33. The Infantry Supporting Weapon — Cannon Company and the Assault Gun

1. General

The Infantry Cannon Company equipped with the 105-mm M3 howitzer was originally intended to be an assault unit with the mission of closely supporting the battalions of the infantry regiment, by direct fire. Due to the great difficulty of concealing the M3 howitzer in forward areas, the vulnerability of the howitzer and crew to hostile fire when exposed, and the difficulty of and the time required for its displacement, the cannon company was not used in its intended role in this theater. It was extensively used as additional supporting artillery for the infantry regiment. It fulfilled this role with excellent results and was considered indispensable by many infantry commanders.

Although the cannon company was entirely satisfactory in the role in which it was used, there still remained the need for a close-support assault weapon, which could advance with the infantry.

2. Employment of the Cannon Company

In some units the cannon company was attached to the light artillery battalion which was in direct support of the infantry regiment, and employed as another battery of field artillery.

The most general employment of the cannon company was under the control of the infantry regimental commander.

When employed in this manner the regimental commander always had the fire of six 105-mm howitzers at his disposal, a prerogative of which he was extremely jealous. The cannon company gave very close support to the infantry battalions, and was capable of firing closer to friendly troops than the "no fire line" permitted the artillery to fire. On a few occasions cannon companies were split into two three-gun platoons, with each platoon in direct support of an assault battalion. However, the cannon company usually fired as a six-gun battery.

Cannon companies were habitually tied in by wire, and/or radio with the direct support artillery battalion. The survey control and metro messages were always made available to the cannon companies. In all instances there was active cooperation between cannon companies and the direct support artillery battalions. At times the cannon company fired missions for the artillery, and the artillery fired missions for the cannon company. Artillery observers adjusted fire for the cannon company, and cannon observers adjusted fire for the artillery.

3. Assault Gun

Most infantry commanders believed the ideal weapon for this purpose should have the following characteristics: minimum caliber 3 in., high muzzle velocity, flat trajectory, high rate of fire, mounted in a full track vehicle of good mobility, low silhouette, with heavy armor for protection of gun and crew, and equipped with good two-way radio. A weapon with such characteristics would be able to provide the desired close support of infantry for which the infantry cannon was unsuited.

34. Mobile Command Posts for Divisions and Regiments

It was the unanimous opinion of division commanders and staff officers that the use of trucks and trailers for division forward command posts was preferable to the use of tents However, there was no need for division rear installations to be made more mobile, since rear echelons moved less frequently,

and had the opportunity to select suitable locations usually in small towns or villages.

Fifth Army issued three command post trucks per division for general officers, which were used as private offices and living quarters. Most divisions used additional trailers and trucks of various types and in various numbers for their forward CPs. Experience proved their use both advantageous and satisfactory. Division command posts moved along routes suitable for the movement of trucks and trailers and were seldom subjected to concentrated artillery fire. Without van-type trucks and trailers, moving a division command post proved a difficult time-consuming task. It required considerable packing and loading, and then unloading and unpacking, during which period effective staff operation was seriously affected. Mobile command posts allowed practically continuous operation during a change of location. In rapid moving operations it was possible for the division installation to be constantly well forward, thereby shortening the lines of communications. Mobile command posts were able to change location on short notice with a limited amount of effort. Their use facilitated the vacating of areas subjected to hostile • artillery, and also increased security by making more frequent moves practicable. Operations sections should have van-type trucks instead of trailers, since they are more easily moved, are more maneuverable, and have more interior space. With their use it would not be necessary to "freeze" QM trucks for the move, and time would be saved. It was felt that the minimum allotment of vehicles provided should be as follows:

1 truck - Commanding General - Private office and living quarters.

1 truck - Asst. Division Commander.

1 truck - Division Artillery Commander.

1 truck - Chief of Staff - Operations with 1 ton trailer.

1 truck - G-3 Operations, with 1 ton trailer.

1 truck - G-2 Operations, with 1 ton trailer.

1 truck - War Room.

1 truck - G-1 Operations, with 1 ton trailer.

1 truck - G-4 Operations, with 1 ton trailer.

In situations where the division surgeon, chaplain or traffic control officer were at the forward command post, there would be sufficient space in the G-1 or G-4 trucks for their small installations. The one ton (van type) trailers listed, would be used as private offices or conference rooms and as living quarters for chiefs of sections.

Regiments found it necessary to acquire considerable equipment above T/E in order for their headquarters to operate properly. This improvised equipment was burdensome, bulky, and difficult to move. Difficulty was also encountered in providing proper lighting facilities, as candles and battery lamps were not suitable nor sufficient in number. Improvised equipment was easily broken. Much time was consumed in the preparation of equipment for moving and then preparing it for re-use. Command post tents were found inadequate for the following reasons: (a) bulkiness; (b) excessive time and labor required in preparation for use; (c) insufficient space; (d) vulnerability to artillery fire; and (e) difficulty of blacking out. As transportation in excess of T/E was not authorized, there was very little experience with mobile regimental command posts. However, it was the opinion of most regimental commanders and staff officers, that, though the use of mobile command posts would solve many of the above difficulties, their use would not prove practical. Regimental command posts were usually well forward and subjected to considerable artillery fire. Large van-type trucks in forward positions would identify them as command posts to ground and air observation.

Whenever possible concrete and stone buildings were used for regimental command posts. British units on the other hand found mobile CPs to be very satisfactory and they recommended and used a minimum of three command trucks per brigade (comparable to U.S. regiment) headquarters.

One U.S. regimental commander stated that he had found a halftrack truck very useful as a command post. Although it

did not mobilize his entire command post, it was large enough to accommodate his operation group and radios. It greatly aided him in moves, and the armored sides afforded protection against small arms fire and shell fragments.

35. Location of Command Posts

During mountain attacks, commanders wanted to keep close to the front. Observation Posts served as OP and CP in many cases. The characteristics of the SCR 300 necessitated locating it on high ground. This often caused company and battalion CP's to be placed on hills. Wire communication was used with difficulty during mountain attacks and many units made little use of it.

When the situation became stable, commanders relied more on wire communication since it was then more easily established and maintained. CP's were located farther from the front lines. This permitted better accessibility, more comfort, more freedom from small arms fire, and good communications.

CP's were located almost habitually in houses. This was not always good practise for platoons and companies, because houses offered good targets to enemy guns. However, the thick walls and underground cellars usually provided safe shelter.

The Infantry Battalion CP group presented a problem because of the large numbers of personnel. Many battalion commanders used a minimum of personnel at the forward CP, the remainder functioning at the rear CP. The forward CP was mostly concerned with operations. Supply and administration was carried on at the rear CP.

The forward CP often contained only the following:
> Battalion commander and two runners.
> Four company runners.
> S-3 and Operation Sergeant.
> S-2 and Intelligence Sergeant.
> Communication officer and one communication sergeant.

One message Center Code Clerk.

Radiomen, wiremen and switchboard operators.

The Battalion Executive Officer usually functioned at both CP's. When room was available at the forward CP, more of the Battalion rear installations were moved forward.

36. Transportation Required to Move an Infantry Battalion

The mountainous terrain and the inadequacy of the road net in Italy often made it necessary for infantry units to move considerable distances without any of their transportation. At other times it was necessary to limit the number of vehicles used to a bare minimum. Infantry battalions learned to load and move all their weapons, ammunition and necessary equipment on about eleven 1/4 ton trucks and trailers. When they moved with this amount of transportation they generally distributed the vehicles among units of the battalion as follows.

The three rifle companies were each given one truck and trailer upon which they loaded their 60mm mortars, their light machine guns, and the ammunition for both, together with any necessary communication equipment.

The heavy weapons company was allotted five trucks and trailers, two of which went to the MG platoons and three to the mortar platoon with one truck for each 81mm mortar section.

The other three trucks were allotted to the Bn. Hqs. Co. to transport radio, communication, wire, and command post equipment. One of these vehicles was often the battalion commander's truck which, after the CP was set up, was used for reconnaissance or liaison.

At times other combinations of vehicles were used, but in general they followed the pattern enumerated above.

37. Rations for Front Line Units

The extensive use of newly developed types of rations, "C", "K", "10 in 1", and in extraordinary emergencies "D",

simplified somewhat the problem of supplying front line units in Italy. Only in rapidly moving situations, during offensive operations did our troops fail to receive at least two hot meals daily. Under such conditions the soldiers in the front lines subsisted principally upon "C" or "K" rations, which they sometimes were able to heat, but which they generally consumed cold. The long supply lines, over mountainous terrain which was of necessity travelled by mule pack train, made attempts to supply front line troops with hot food at night extremely difficult, and a great deal of the time impossible. Hot food when it did arrive at front line positions was usually received so late in the night that troops would not get up to eat it. The lack of food containers suitable for mule pack transport was a serious handicap. Hot coffee, carried in water cans wrapped in blankets, was often carried forward with rations. Bread was also used at times to supplement the emergency rations.

During periods of little movement or while in defensive situations, front line troops adopted their feeding plans to their individual situations. Some front line troops defended and lived in substantial stone houses equipped with native stoves and fireplaces. Their rations, usually of the 10 in 1 variety, were taken up to the platoon and squad positions at night. It was cooked on the native stoves or on the squad cookers which were issued. Most of the front line troops preferred the 10 in 1 ration to either "C" or "K" and many liked it better than even the B ration issued to troops feeding in rear areas. Some companies when practicable brought up their kitchen equipment and installed it in a convenient building. There the food was prepared and carried in marmite containers to platoon and squad positions. This method of feeding was not common, for most units preferred to prepare their rations at their squad or platoon locations, since movement outside of houses was usually restricted during daylight hours.

In some areas houses were not available and front line troops prepared dugouts and various types of shelters in which they cooked their 10 in 1 or C rations over their squad cookers. These little stoves were greatly appreciated by the front line

163

soldiers. They operated on gasoline, which was easily supplied, and required but little attention. The rations could be easily prepared into satisfactory meals by the average soldier who generally required no special instruction in cooking.

38. War Dogs.

1. Scouts

Scout dogs used with infantry patrols proved of great value because they could detect the presence of the enemy long before the patrol itself had any indication thereof. This gave the patrol a greater sense of security, even though entire responsibility for detection could not be placed on the dog. The reactions of the dog were read by the handler and communicated by him to the patrol leader. In patrolling, dogs were of particular advantage in determining whether or not houses were occupied.

It was found that dogs could best be used in static situations. They were trained to work carefully and methodically. In an attack or assault where movement was rapid, the excitement and confusion distracted them, and made them relatively ineffective.

Dogs could not be utilized to good advantage on ambush patrols. The long periods of waiting involved, often in cold and wet positions, and the necessity for absolute quiet made the dog restless and uncomfortable. As a result he lost his alertness and became noisy.

2. Messengers

Dogs as messengers were used rather infrequently, largely because wire or radio communication could usually be employed. On occasions where wire communications were disrupted by shellfire, the dogs proved of great value. They moved very rapidly, and due to their size attracted less attention than a human runner. As a rule, dogs were most reliable as messengers if their run were a mile or less in length. A team

consisting of two men and a dog was used. The dog ran on order from one man to the other, one man being stationed at each end of the run. The dog was sent on a trial run shortly after arriving at his post, to become familiar with the route. Usually the dog first followed the trail by scent but later could depend upon sight.

An example of the employment of messenger dogs was the maintenance of communication between the forward and rear CPs of an infantry battalion which had no wire communication. Two teams were used during daylight hours when human runners would have been observed. The run was 1¼ miles in length over very rough terrain and was scheduled at 1030 and 1630 hours each day. On the return trip the dog carried several pounds of supplies. It was found that while it took a man more than an hour to make the trip, a dog could cover the distance in 12 minutes. Occasionally the runs were made under intermittent shellfire.

3. Sentries

War dogs proved very valuable as sentries about CPs, dumps and other installations. The requirements for sentry dogs were greater than the number of dogs available for this work. On perimeter patrols, three man-dog teams replaced six men normally used, and their use caused the apprehension of a greater number of unauthorized persons entering the patrolled area.

It was found that sentry dogs tended to rely almost entirely on sight and sound. If they were to be used tactically as scouts or messengers they had to be retrained to rely on their sense of smell.

Dogs were not used on outposts with the infantry because of the long periods of quiet waiting required.

4. Mine Detectors

During their refresher training in rear areas after arrival in this theater, dogs which had been trained to detect mines were found to be very unsatisfactory. Since most mines in this theater were laid sporadically rather than in extensive

fields, there were long periods of searching during which no mines were found. Under these conditions, the dogs became listless, losing their alertness. Although they continued to sweep the area, the dogs in reality had stopped searching. In ground which had been fought over, the dogs pointed at shell fragments, at places where explosions had occurred, and at other malodorous spots. Heavy gunfire close at hand and the loud noises of mechanical equipment, armor, and heavy traffic detracted from their efficiency.

The only mine detection company brought to this theater proved so unsatisfactory during its training period that they were never used operationally in forward areas, and were returned to the United States.

5. Effect of Terrain

Precipitous trails presented no difficulty to the dogs, but made it difficult for the handler to read his dog on the move, particularly in the dark. Thickly wooded or bush country made operating difficult because the leash often became entangled in trees or bushes.

6. Effect of Weather

Rain and cold caused the dogs to worry about their comfort. This detracted from their working ability. Rainfall obliterated the scent of trails. Mud made movement of man and dog as a team almost impossible. Snow, if soft or melting, tired the dogs rapidly, thus shortening their effective working hours. Crust on snow was advantageous.

7. Reaction to Enemy Fire

Dogs seldom appeared to be affected by small arms fire. When in the near vicinity of mortar and artillery fire, most dogs showed nervousness, whined, etc., especially if not actually working at the time. During training, both men and dogs must become thoroughly accustomed to the sounds of artillery and mortar fire explosions, tank operation, and other battlefield conditions.

Chapter Four

INFANTRY

INFANTRY

1. *Aggressive Action*

One of the most important lessons learned by our infantry troops in the Italian campaigns was the value of prompt aggressive action in any situation where our troops were advancing. The lesson was not easily learned, but was based upon costly experience.

A tendency to stop and take cover whenever they received enemy small arms fire became prevalent in our small units. This tendency was not only shown by some troops in their first engagement with the enemy, but was more common among troops that had been in continuous action for a prolonged period.

Troops that thus permitted themselves to be pinned down were inevitably subjected to deadly mortar and artillery concentrations which very often caused excessive casualties. German positions were habitually so well concealed and camouflaged that they could not easily be located. Our troops had a strong inclination, when fired upon, to dig in without returning the fire, inasmuch as they could see no suitable targets at which to fire. When they did return fire into the hostile area, the German fire either materially decreased or stopped. Some units quickly learned that the proper procedure to take, when fired upon, was to return the fire promptly, deploy a force sufficient to overcome the resistance, and keep on going. It was shown repeatedly that units which pressed their attack vigorously suffered far fewer casualties and were more uniformly successful than those which hesitated or stopped when fired upon. Our troops learned that whenever they stopped moving against small arms fire, they always received heavy mortar and artillery fire which caused more numerous casualties than would have been inflicted by the small arms had they kept moving. Those few units which, after being pinned down, broke under

artillery and mortar fire and attempted to get out of a shelled area by running away suffered most heavily.

2. Fire Control in Small Infantry Units

Controlling and directing the fire of their units proved to be one of the most difficult tasks of squad and platoon leaders. When an infantry platoon engaged in a fire fight, the platoon leader could not personally control the fire of the whole platoon, and had to rely upon his squad leaders. Often in rugged terrain it was impossible for the squad leader to direct the fire of all men in his squad. Too often, squad and platoon leaders engaged in, rather than controlled the fire fight. This practice, which was admittedly wrong, was most common among inexperienced leaders.

In an advance our troops were often reluctant to return enemy fire because they felt that the flash and muzzle blast of their rifles would reveal their positions and thus subject them to more accurate enemy fire. It required great effort on the part of the small unit leaders to get the men to fire their rifles, and in mountain attacks, few rifle companies ever employed a sufficiently large volume of small arms fire. When a platoon did engage the enemy with the controlled fire of all of its weapons the results were usually most successful.

The BAR was respected not alone by our infantry but also by the enemy. Generally the BAR man controlled his own firing in the attack, selecting and attacking targets he could see or selecting likely spots at which to fire. Too often the squad leader and other members of his squad depended too much upon the BAR. Although it proved itself a valuable weapon in all terrain and under all conditions, it was often used to engage targets that were more suitable for the M-1 rifle.

3. Junior Leaders in the Attack

The infantry platoon leader has no means of knowing what is going on in his area except by "being there." In mountain attacks, success depends mainly upon maintaining

direction and staying on the route chosen. When not actually engaged with the enemy, the platoon leader should follow the scouts at the head of his platoon where he can control direction and guide his scouts. He must advance with his men in the attack, but should not be the leading attacker, as was too often the case. During fire fights, he must avoid becoming personally engaged to the extent that he is unable to control the action of his platoon. Entire platoons, at times, considered themselves "pinned down" when their leader was unable to move. Platoon NCOs also are inclined to do too much of the fighting themselves, thereby neglecting their duties as leaders. Squad leaders in particular were prone to take up the fight with their own rifles, neglecting or losing control of the other men in the squad, and thus failing to develop the full fire power of their units.

The fact that casualties are high among their ranks is understood by all junior infantry officers, but all agree that aggressive leadership is essential. Platoons that close with the enemy receive fewer casualties in the long run than platoons which "dig in" when fired upon.

Company Executive Officers and 1st Sergeants should not be permitted to stay in the company's rear area or in the CP. They must move about the company area to ensure that contact is maintained and to prevent straggling.

4. Marching (Assault) Fire

In the Italian theater, experience in the use of marching fire was limited, but under suitable conditions it was found very effective.

The mountainous terrain afforded very few opportunities for marching fire. Objectives were often a considerable distance apart and separated by deep ravines. It was often necessary for advances to be made in single file and a platoon front was seldom possible. Much of the Italian terrain consisted of extremely steep slopes, rocky or terraced, where a swift advance was impossible. The enemy usually occupied

positions that were well selected, dug in and camouflaged, and his exact location was extremely difficult to determine. A slow advance strongly supported by fire was found necessary under these conditions.

When attacking down ridge lines, over reasonably open terrain or on hills easily accessible to foot troops, assault fire was used very effectively by our troops. Commanders and troops alike favored its use where conditions warranted. Casualties inflicted by enemy small arms fire were not as severe when assault fire was used in the attack as they were when other methods of advance were employed. The issue of additional ammunition for these assault fire engagements was not found necessary.

5. Use of Cal. .50 MGs in Defense

Caliber .50 MGs were used extensively on the winter line south of Bologna and on the Anzio Beachhead. They were used mostly for long range overhead harassing fire. In some units they were formed and fired in batteries, and were available on call to fire on any appropriate missions. In other units they were placed under the control of smaller units. Crews were obtained mostly from battalion anti-tank platoons, anti-tank companies and heavy weapons companies. Most of these men already had had training with the weapon, and therefore little additional training, both individual and team, were necessary.

Most of the firing was indirect and at night. Targets selected were usually supply trails, avenues of approach, probable assembly areas, and the immediate vicinity of buildings used by the enemy or believed to be occupied. These targets were usually located from ground OP's, maps, aerial photos, and from PW information. Supply and communication routes were sprayed continuously during the night by short bursts from different guns. PW reports indicated that Germans were considerably harassed by this type of fire since they could not tell when, or from where it was coming. In some instances the

50 Cal. guns were used very effectively to fire directly into the openings of caves in cliffs. The use of the .50 Cal. guns in harassing the enemy proved very effective in that it restricted his movements on trails and roads and prevented him from supplying his troops with ease or security.

6. MG Defensive Fires—Use of FPL

Machine guns on the defense were generally used to cover sectors. Their use on FPL's was very limited due to the rugged terrain. In most cases the gun was emplaced so as to cover a wide sector, and close to a good observation point. It was generally dug in and sand-bagged to afford protection to the crew. Usually one platoon of HMG's was placed close to the front line where it could give close support to the riflemen and also be used for long range firing, at the same time having the riflemen for local security. The two sections were usually close together, between 100-300 yards apart, to facilitate the problem of supply. This front line platoon was always coordinated with the LMG's of the rifle companies which were on the front line. The other HMG platoon usually was disposed in depth in positions to stop the enemy in case of a break through, and also to deliver long range overhead fire. The guns of the rear platoon were generally located on the reverse slope of a hill, with alternate positions, as it was found unwise to place them on the forward slope due to enemy artillery fire. Sometimes the rear platoon was used to cover an open flank which provided a good avenue of approach for the enemy. The LMG's of the reserve company usually remained with their organization. If additional HMG's or LMG's were needed on the MLR in a defensive set-up, they were requisitioned and usually made available. Many heavy weapons companies however, in addition to their HMG's had eight LMG's, one set of guns being kept with the kitchen.

The coordination of HMG's with LMG's within a battalion was generally accomplished by the Heavy Weapons Company

Commander. FPL's were used especially in stabilized situations of long duration where terrain was favorable, such as the Anzio Beachhead. This terrain was flat or slightly rolling and fairly good FPL's were afforded, many of them without dead space. The guns were placed on the MLR. In some instances MGs were placed in the second story of a building away from the door or window and sandbags used to give them a firm base. A blanket or burlap was used to screen the opening so that the smoke and flash would not disclose the gun position.

Range cards were accurately prepared for each MG position, and each key man had a copy. They were especially essential in defensive positions because MG crews were usually relieved by other crews from time to time.

7.   Use of Tracer Ammunition at Night

In general, our use of tracer ammunition at night was very infrequent because its use tended to disclose our positions with no compensating advantage gained. In firing individual small-arms (rifles and BARs) at night, tracers were very seldom used, and then only because tracers were packed with ball or AP ammunition. When machine guns were used for harassing purposes at night, they were generally laid during the day and zeroed-in with tracers, but during the actual firing at night very few tracers were fired. Both the HMG and .50 caliber MG belts were stripped of their tracers which were replaced with ball or AP ammunition. In a few instances, .50 caliber MG and 90-mm anti-aircraft tracers were used to point out the direction of advance and to mark the boundaries of units in night attacks.

The Germans used a great deal of tracer ammunition at night. Information from PWs indicated that tracers were used mostly in light machine guns. Because of the great dispersion of the weapon, the tracers were used to help keep the guns on the target. This held true for daylight firing but

had little advantage at night. Many times our patrols could observe the trajectory of enemy fire and move from place to place under this fire without endangering themselves. When ball ammunition was used, only the "crack" was heard, and since it was difficult for our troops to tell how close the bullets were passing they had a tendency to stay under cover. Many times the Germans on one side of a hill would fire grazing tracers along its crest, thereby disclosing the approximate location of his position and informing our troops exactly where his defensive fires were sited. After October 1944 the Germans used much less tracer ammunition than they had used previously. G-2 information indicated that this was due to a shortage of that type of ammunition.

8. Grenades

Grenades were used extensively by all infantry units with excellent results. The fragmentation hand grenades were very effective for close-in fighting, for stopping hostile assaults, mopping up pill boxes and MG positions, and for clearing houses. In the attack and on patrols, infantry soldiers habitually carried at least two fragmentation hand grenades.

The fragmentation rifle grenade was also very effective, and with a little training soldiers became very accurate in its use. It was used against groups of personnel in the open, against MG positions, and in clearing houses by firing through open doorways and windows. Frequently it was used in conjunction with AT grenades in attacking occupied houses; AT grenades were fired through doors or windows and the rifle grenades fired close to the house to inflict casualties as the occupants came out.

The AT grenade was effectively used against armored vehicles, pill boxes, houses, and dug in gun positions. This grenade had a terrific concussion effect as well as penetrating power. In one instance the use of AT grenades broke up a three tank attack on a company position at a time when

artillery support was not available. In another instance a light tank was knocked out and the crew killed by hits from two AT grenades.

The smoke (WP) grenade was very effective in clearing the enemy from caves and dugouts, where at times fragmentation grenades would not do the job. On occasions they were used as incendiaries. Some preferred the WP grenade to the fragmentation grenade for general use.

The offensive grenade was used very little when fragmentation grenades were available. Troops found the fragmentation grenade could do the same job as the offensive grenade, and do it better.

9. Flares

Extensive use of flares was made by a few units for both signalling and illumination, while other units used them very sparingly. The flares were used to show location of units or patrols upon occupying limited objectives, as pre-arranged signals for calling for and lifting artillery and mortar fires when wire and radio communication failed, to give directions to returning patrols, and to illuminate areas.

The projector, pyrotechnic, hand, M-9 with signals No. AN-M28 through AN-M36 was often used for signalling. It was easy to carry on patrols and was capable of being used quickly. It was not always on hand when it was needed, however, as it was a special piece of equipment and usually only one projector, with a few flares, was carried by the Company Headquarters group.

Trip wire flares were used extensively for local security in stabilized situations. They were easily installed and gave good illumination. They were used generally to cover avenues of approach which were easily covered by machine gun or rifle fire.

The rifle grenade flare was not used extensively. It was a fairly good illuminating flare, and in addition was used

for signalling purposes. It had a range of approximately 600 feet, and burned for 20 to 30 seconds with a 20,000 candle power light. However, it had a definite "pop" just before it illuminated which warned the enemy to "freeze" in position before the illumination took place.

The 60-mm flare had a range of approximately 1,200 yards. Illumination took place approximately five hundred feet above the ground and the flare descended by parachute at approximately ten feet per second. This flare burned for twenty-five seconds with a 145,000 candle power light, thus giving sufficient time and illumination for good observation. Another advantage of this flare was that it gave no warning before illumination.

10.   Use of the Bayonet

The bayonet was rarely used in the Italian campaign, and many men disposed of them during advances. In the few instances where bayonet assaults were carried out, they were successful and completely demoralized the enemy. Our troops always preferred to shoot, and it was seldom that close enough fighting was encountered so that the bayonet could be used.

The German soldier seldom carried a bayonet, and our casualties from his use of it were negligible.

It was the consensus of opinion of infantrymen that the bayonet should be retained as an infantry weapon because possession of it had a morale building effect upon our soldiers, and because the fact that our infantrymen were armed with the bayonet, and on occasions used it, had a demoralizing effect on the German soldier.

Training in the use of the bayonet hardens the soldier both physically and mentally, but too much training time was wasted on "by the numbers" drill in positions, parries, jabs, thrusts, etc. Actual running of the bayonet course, use of dummies, and training in "rough and tumble" fighting are beneficial and should be continued.

11. Utility of the Carbine, SMG and the Automatic Pistol

The carbine, cal. 30, proved to be an excellent weapon for firing at short ranges. Its modified sight which permits changes in range and deflection greatly increased its accuracy. Most small unit leaders who were at times drawn into a fire fight preferred the carbine to the automatic pistol because of its accuracy and longer range; they usually preferred it to the SMG because of its lesser weight.

The SMG proved to be invaluable in fighting in areas covered by dense foliage, in village and street fighting, in clearing out houses, and for use on patrols. Though its range is limited, its great volume of automatic fire made it an excellent weapon for covering small areas where the targets were indistinct or fleeting. Its large volume of fire, delivered at close range, had a great demoralizing effect on the enemy.

The automatic pistol, cal. 45, proved to be a good weapon for the purpose for which it was intended, i.e. personal protection against an enemy at close range. It is not considered to be a suitable weapon for leaders of small infantry rifle units. However it was the opinion of most infantrymen that men armed with the rocket launcher, men in MG and mortar crews, radio operators, and wire crews should be armed with the pistol. A carbine or rifle hampers these men in their movements and in the handling of their primary weapons or equipment. A pistol is believed sufficient for their self protection, and allows them greater freedom of movement.

12. The Browning Automatic Rifle

The BAR has proved an excellent weapon and needs no modification. There were no complaints as to its mechanical functioning and very few stoppages were reported. Most officers suggested adding 6 more BARs to the Company without adding to the number of magazines per BAR team.

Many suggested leaving off the bipod to save weight, figuring that in a defensive situation, when the bipod is of greatest value, machine guns (lights or heavies) could be brought up to provide defensive fires. The LMG with bipod and shoulder rest was considered excellent but should not replace the BAR, whose firepower is ample if handled by a man who really knows how to use it. The BAR was unanimously acknowledged to be the backbone of the infantry squad. Related experiences of junior officers and NCOs indicated that the Germans also held this view. In all infantry engagements the enemy constantly gave priority attention to the BAR in the squad. The BAR was credited with the disruption of many enemy counter attacks. Consequently our present BAR, and LMG with bipods and shoulder stock attachments are considered highly satisfactory. Here again as with other weapons, the need of a flashless and smokeless powder is paramount.

13. The Heavy MG Cal. .30 compared to the LMG Cal. .30

In general in fast moving situations the LMG is considered the better weapon because of its maneuverability and lighter weight. More ammunition can be carried by its crew, and it has been found that fire is never sustained long enough to injure the barrel. When the situation has become stablilized the HMG can always be brought up in time to establish a FPL or to deliver overhead fire. The HMG has proven its value in defensive situations and for overhead fire. Rifle company commanders preferred the addition of one LMG, and the dropping of one 60mm mortar in the weapons platoon, since normally only two 60mm mortars were used. They also favored an increase in personnel of the LMG squad to provide additional ammunition supply and to provide replacements for the LMG squad casualties which were heavy.

The following modifications to the LMG were found desirable:

(1) A modification on the front barrel bushing. This

179

device did not lock securely enough and was too easily lost. By the addition of two small link chains on either side of the bushing which will fasten by insert pin on to the bipod or jacket, the bushing will always be secure. Loss of this bushing is a serious matter as the gun will not fire automatically without it.

    (2) Adoption of a metal or plastic link-type ammunition belt. The cloth belt was highly unsatisfactory when exposed to wet weather. The resultant swelling of the cloth did not permit smooth feeding and automatic fire.

    (3) Adoption of the German principle for change-over of the barrel; the German method is smoother, faster and easier.

14.　Caliber .30 MG Fire

Light MGs delivered most of the short and some medium range fire, and were mostly used on the front line. They were used to cover avenues of approach during defensive periods, or during periods of reorganization in the offensive. They were also used in establishing a base of fire for maneuvering riflemen.

Most of the medium range firing was done in connection with offensive movements. The normal use of medium range fire was to cover the flanks and to place fire on probable enemy positions, while the riflemen maneuvered to assault these positions.

Long range MG fires were generally used in the defense for harassing missions, the targets being road junctions, trails, supply routes and probable assembly areas. These fires were usually delievered at night. In a few instances during the offensive, on terrain covered with thick underbrush, HMGs were used to deliver long range harassing fires. This was done since, due to the undergrowth, no targets for these weapons presented themselves close to the front line. This fire was placed on probable routes of withdrawal and on routes of supply.

Very little indirect firing except harassing was done with the .30 caliber HMG. Due to the rugged terrain our guns almost invariably could be placed in positions from which direct fire could be delivered, or which afforded partial defilade.

15. Alternate and Supplementary Positions for MGs and Mortars

Alternate and supplementary positions were generally provided for MGs in the defense, but these were seldom used. Normally the primary position was well dug in and offered more cover and protection due to the continuous work on the position, especially in a stabilized situation. It was usually needless to shift a MG to a supplementary position in the defense due to the fact that other automatic or semi-automatic weapons could be shifted more easily and with less exposure to cover any situation which was likely to arise. Generally, alternate positions had to be placed at least 200 yards from the primary position, due to the fact that the fire which harassed MGs most was mortar and artillery, both indirect, and therefore not too accurate. In moving less than 200 yards MGs very frequently would still be subjected to the same harassing fire.

During the offense, alternate and supplementary positions were usually selected, but were seldom occupied. MGs were rarely moved due to receiving small arms fire, but were usually moved when the primary position was brought under direct fire from self-propelled or tank guns. Mortar positions were generally selected in good defilade and alternate or supplementary positions were very seldom needed. However, one instance was reported where a mortar position was being shelled so heavily that it was necessary to move it a distance greater than four hundred yards to get out of the impact area.

16. Maximum Firing Capabilities of the 81mm Mortar

Battle experience indicated that the firing of 18 to 20 rounds per minute caused overheating of the 81mm mortar after three to four minutes of sustained fire. This overheating caused premature burning of the propelling increments, which in turn caused "short" rounds, bulged barrels, and occasionally burns to the No. 2 man. A rate of 8 to 10 rounds per minute, however, could be maintained without dangerously overheating the mortar tube.

Increased range (approximately 300 yards) was obtained by using a total of 8 increments, but damage to the base plate and shock absorbers usually resulted.

17. HE for 81mm Mortars - Light Projectile compared to Heavy

All infantry units expressed confidence in the 81mm Mortar and its ability to lay down thick demoralizing fire with either heavy or light ammunition. Some trouble was found with the HE light failing to explode in soft soil. A supersensitive fuse for use under such conditions would be desirable. In general much more HE light was used than HE heavy, since the light projectile had a greater range, was more easily supplied to the forward positions, and had greater casualty effect on personnel. Direct hits were often registered with HE heavy on fortified positions with no greater effect than the HE light. In most cases the mortars were disposed in depth, and the rear section was the most logical one to fire the HE heavy due to shorter ammunition haul. In most cases, however, they were out of range to fire that type of projectile on appropriate targets. The firing of HE heavy damaged the mortar tubes much more than the HE light. All 81mm mortar units were in agreement that the HE light was much more accurate than the HE heavy at any range. Mortar men were reluctant to

fire HE heavy close to their front line troops, whereas in many instances the HE light was fired successfully within forty yards of the front line. One good feature of the HE heavy was that it usually penetrated the roof of a house before exploding while an HE light did not.

18. Use of Smoke Shell for 81mm Mortars

Smoke shells were used extensively with good results by many units. However, this type of shell was not available in abundance and was somewhat heavy to handle. Generally no more than the normal allowance for basic load was on hand. The smoke shell was usually used to register on targets, but since the smoke and HE shells were not of the same weight, some difficulties were encountered. It was felt that a smoke shell of the same weight and shape as the HE light would greatly facilitate fire adjustment. It was difficult for forward observers to distinguish between the artillery and mortar smoke shell. Many times artillery and mortars were trying to register on the same target at the same time, and it was difficult to distinguish which was which since the artillery and mortar OPs were not together. Different colored smokes available for registration would obviate this difficulty. In some instances smoke was used with success to screen the movement of patrols and tanks. In addition smoke shells were used to orient infantrymen as to their objective, and also to set fire to inflammable material, such as hay stacks.

19. Replacement of the 81mm Mortar by the 4.2″ Mortar

Experience during the Italian campaigns did not indicate the desirability of replacing the 81mm by the 4.2″ mortar. The 81mm mortar was heavily relied upon since it was very accurate and effective against personnel. It had sufficient range and was much lighter and more maneuverable than the 4.2″ mortar. It delivered a heavy concentration on a given

target in a short time. The 81mm mortar ammunition was lighter than the 4.2″ ammunition and therefore the ammunition supply problem in rugged terrain was less difficult.

However, the 4.2″ mortar proved to be a very effective weapon. Some suggested that 4.2″ mortars be made available continuously or permanently to the infantry regiment. A solution proposed was that the AT Company of a regiment, and the AT platoon of an infantry Bn. be given a T/O allotment of 4.2″ mortars and be trained to use them as a secondary arm, since the 57mm AT gun was rarely used in the mountains because of difficulty of movement and emplacement. Thus when operating over terrain not suitable for the employment of the 57mm gun, these AT units could be used effectively as mortar units. This could be accomplished without the need of additional vehicular equipment or personnel. Many commanders, however, opposed the idea of having two types of weapons in the infantry AT units.

20.   The 37mm Gun as an Infantry Close Support Weapon

The 37mm gun AT M3 was ineffective against tanks used by the enemy, and therefore its use in close support of infantry in mountain warfare was restricted to firing at groups of personnel, MG emplacements and lightly fortified buildings. These guns were considered satisfactory for such uses, except that in most instances it was difficult to get the gun close enough to the front to be able to use it effectively. It was not easily manhandled on rugged terrain, and the concensus of opinion appeared to be that a gun of the same capabilities of a lighter design would be desirable. The modified 37mm gun mounted on a tripod was introduced in the theatre in the spring of 1945. It was used by a few units on the front line with good results. It was emplaced on the MLR, and fired directly at enemy MG positions. These positions were either destroyed or forced to change location. Those who fired the modified 37mm gun on the front line commented on its accuracy up to

1,500 yards, its simplicity and its lightness. The only unfavorable characteristic of the weapon was that it had to be relaid after each round fired, since the tripod mount was not sufficiently stable. The weapon was not used sufficiently in combat in Italy to permit a definite statement as to its suitability or desirability for use. Developments in the field of recoilless weapons will undoubtedly influence any decision as to the most effective weapon for the close support of infantry.

21.   57mm Anti-tank Gun

The 57mm anti-tank gun, proved suitable for its primary role, e.g., battalion and regimental area defense against tank attack. It was found, however, that the weapon lacked maneuverability. Since the crew could not manhandle the weapon any distance (except short distances on level ground) it appears desirable to have a self-propelled gun of the same capabilities, preferably full track and of low silhouette. Such a weapon could be maneuvered into position, fire the required number of rounds at the target and then get back under cover. During the fighting south of the Arno River, where the terrain was not too rugged, the 57mm anti-tank guns were often used on point targets, such as fortified houses and strong points. However, since the guns were fairly close to the front line their muzzle flash was easily picked up by the enemy and they drew considerable fire. A self-propelled gun would have been of more advantage than the towed gun in this situation. It was suggested by many that the 57mm AT gun should have a "muzzle-brake" to reduce the muzzle blast, since, on dusty or sandy terrain it kicked up a very large cloud of dust which helped to disclose its location.

22.   Comparison of the 75mm Pack Howitzer with the 105mm M3 Howitzer for Infantry Cannon Companies

Cannon companies in one division were equipped with the 75mm pack howitzer, while others used the towed 105mm M3

howitzer. This difference in the equipment of units used under similar conditions and circumstances made possible a comparison of the two weapons to determine their relative suitability for use in mountain warfare. The following points were considered in this comparison:

a. *Mobility.* The M3 howitzer, which weighed about 2,600 pounds was only as mobile as its 1½ ton 6 x 6 prime mover, since it could be manhandled only short distances upon relatively level ground. The 75mm pack howitzer was much more mobile. Weighing only 1,400 pounds it was capable of being disassembled into separate loads which could be hauled in ¼ ton trucks, placed upon mules or carried by hand, although it was usually transported in 2½ ton 6 x 6 trucks. Two complete weapons were carried in one such vehicle. This weapon could be hand-carried to positions inaccessible to mules.

b. *Ammunition Supply.* The supply of ammunition to the pack howitzer was easier than to the M3. The complete round for the former weapon weighed 17 pounds while that of the latter weighed 42 pounds. Trucks normally carried twice as many 75mm shells as they could of 105. When supply was by mule pack train, this difference in weight of shell was very important.

c. *Range.* The 75mm pack howitzer had a maximum range of 9,600 yards, while the M3 could engage only targets within 8,300 yards. This difference in range was increased by the fact that the pack weapon could usually be employed much nearer the enemy and thus could reach well beyond the limits of the towed gun.

d. *Accuracy.* The weapons were considered equally accurate and both displayed the same weakness of considerable dispersion when fired at maximum range.

e. *Traversing Characteristics.* The split trail construction of the M3 permitted greater traversing than the single trail of the pack weapon. To effect a traverse of over 40 mills the trail of the pack howitzer had to be lifted and shifted from one side to the other. When emplaced on muddy or soft ground this weapon would after a few rounds, bury the spade. Thus

it was usually necessary to dig out the spade when shifting direction of fire.

      f. *Effectiveness.* The greater weight of projectile with its larger explosive charge, gave the 105mm howitzer shell a somewhat greater bursting radius and considerably more concussion effect, than was the case with the 75mm.

The 75mm pack howitzer was considered more suitable than the 105mm M3 howitzer for the use of infantry cannon companies engaged in mountain warfare, such as that encountered during most of the Italian campaign.

23. *Assault Team Weapons*

Assault teams armed with the rifle, the BAR, and the Bazooka were employed to a great extent against fortified houses and dugouts. The BAR formed the nucleus of the team. It was usually employed with a few riflemen as a base of fire, while the building was being investigated. The bazooka rocket had little effect on thick stone or concrete walls but was very effective through doors and windows. In many instances the anti-tank grenade was used effectively in the same manner. The flame thrower was seldom used as an additional weapon in such assault teams. It was found that they were not essential in attacking houses since the bazooka rocket or the anti-tank grenade fired through the door or window of a house usually sufficed. The flame thrower, however, was used to great advantage in assaulting pillboxes or well protected dugouts, since the bazooka rocket or the anti-tank grenade failed to penetrate their reinforced walls.

One reason for not using the flame thrower to a great extent was the lack of specialist operators. To operate it successfully in combat the soldier must be very proficient with the weapon and be able to keep it in proper adjustment. It was generally believed that these specialists should come from combat engineer units, and should be made available to the infantry when needed.

24. Relative Merits of Caliber .30 Ball and Caliber .30 AP Ammunition

Both AP and ball caliber .30 ammunition were very effective when employed on targets for which they were designed. The armor-penetrating quality of AP ammunition was desirable during the period the enemy was employing numerous light vehicles and straffing planes. During that period front-line leaders requested an increase in AP ammunition. Both AP and ball ammunition were carried.

Ordnance reports indicated the following comparison between AP and ball ammunition:

a. AP ammunition was not as effective against personnel as ball ammunition in that it did not have the same spattering effect. AP ammunition made a clean hole through flesh and bone, whereas ball ammunition frequently ricocheted from heavy bones and caused greater tissue damage.

b. AP caused more damage to the bores of rifles and MGs, than did ball ammunition.

c. Ballistic qualities of AP and ball ammunition up to medium range were practically the same.

d. AP ammunition was more effective against lightly armored vehicles.

The use of a single type of ammunition (AP) was preferable to using both types, and after the fall of 1943 only AP was shipped to the theater. However, both ball and AP were used thereafter to utilize existing stocks of ball ammunition.

25. Ammunition Stockage for Mortars and Machine Guns on positions in the Defense

During the Winter of 1944-45, 81-mm mortar ammunition was limited and rationed to front line units. Previous to this time, the 81-mm mortar had been used extensively on defensive position harassing programs. Due to the limiting of the 81-mm

mortar ammuniton, the 60-mm mortar was substituted for harassing fires and consequently a larger amount of 60-mm mortar ammunition on position was required. Ammunition for the 60-mm mortar was plentiful.

Resupply of ammunition was difficult in mountain defensive positions. Mule trains were used and the minimum resupply time was usually between four and six hours. Often it was not possible to supply during daylight because of exposed supply routes. These conditions necessitated maintaining a larger amount of ammunition on position. Under such conditions there should be one thousand rounds of 81-mm mortar per active section, and one thousand rounds per 60-mm mortar three-gun section, on position. This was normally sufficient to provide for emergency fires to stop enemy counter-attacks or patrols, until resupply can be accomplished.

It was found that, because of the bulkiness of mortar ammunition and the everpresent hostile mortar and artillery fire, it was difficult to store properly large amounts of mortar ammunition near positions. In situations where resupply could be made in a short period of time, it was advantageous to keep mortar ammunition stored in battalion and regimental dumps. A supply on position of two hundred rounds of 81-mm mortar per section and three hundred rounds of 60-mm mortar per section was sufficient under these conditions.

Machine guns, at positions difficult to resupply, maintained a supply of 25,000 rounds per section of heavy machine guns, and 20,000 rounds per section of light guns. In positions more easily resupplied, 12,000 rounds per section for both the light and heavy machine guns were usually maintained.

Positions that were supplied by mule train experienced a great deal of difficulty in protecting machine gun ammunition from the weather. On long hauls, mules could not carry a case (1,250 rds.) on each side so the cases were opened and split, thus exposing the ammunition to the weather. It was also impossible to keep moisture away from ammunition stored on positions. Belts became wet and ammunition

corroded so that it could not be used. A constant resupply was necessary to replace ammunition rendered unserviceable by the weather.

26. Pioneer Equipment of Infantry Units

The A and P platoon had sufficient equipment to accomplish the repair and construction which it was usually required to perform. Its work consisted mostly of preparing light field fortifications, clearing gaps through mine fields for the passage of foot troops and light vehicles, and performing light maintenance of roads and trails. Most A and P platoons in Italy did more supply work than pioneer work, i.e., they carried ammunition, water, and rations to assault companies and usually controlled the pack-mule train of the battalion. The tool kits were seldom used during offensive combat, but were used extensively in defensive situations. The shovels and picks were not used a great deal by the A and P platoon but were issued to front line rifle companies where they were used for digging fox holes, gun emplacements, and shelters. The number of axes in the A and P tool chest was not ordinarily sufficient to provide for the needs of the platoon and also of the front line companies. Axes were used not only in construction work and for clearing fields of fire, but also to procure the fire wood which was used to heat the buildings and shelters in which the men lived when not actually out in position.

27. The Soldier's Pack

The pack carrier and haversack were considered suitable for their purpose until troops reached the forward assembly area. From there forward into the attack, however, it was questionable as to just what to carry. It was learned that procedures considered normal in manuals were usually impractical in rugged mountain terrain. The dropping of the rolls meant in most cases that they would not be available again until the unit came out of the line, or went into reserve. For

this reason in many units the men carried a light roll consisting of either a blanket or shelter-half, or both. When the blanket was carried it was usually made into a roll, tied with a tent rope and slung over the man's shoulder. When only a shelter-half was carried, it was folded and looped over the back of the soldier's cartridge belt. The procedure of bringing the rolls forward with the rations was usually not practical. In many cases the rations and ammunition were hand-carried over trails impassable for jeeps and mules, and to hand-carry the rolls in addition was an impossible task for the carrying party. Many night attacks were made and by daylight troops found themselves where daytime movement was restricted, and were therefore unable to get their rolls forward. It was usually impossible for infantry commanders to develop any SOP for bringing up rolls at night during offensive operations; normally decisions had to be made from day to day according to existing conditions. Some units did not use individual rolls, but made squad blanket rolls because of the reduced space required for their transportation. After the issue of sleeping bags to the individual soldier, in the winter of 1944-1945, the same difficulties were experienced as with the blankets, in getting the bags forward during offensive operations.

Only when advancing over terrain which had a roadnet suitable for jeep and trailer transportation did the procedure of transporting the blanket rolls or sleeping bags to the areas of the assault troops work satisfactorily. At other times the soldier carried his blanket or shelter half in some improvised manner.

The combat pack was seldom carried into the attack; essential items, normally carried in the haversack, were carried in the soldier's pockets or inside his shirt. Mess equipment, except for the spoon and canteen cup, were left behind with the pack. Few hot meals were served during attack operations, and the emergency ration required no mess gear other than the spoon. When it was possible to serve hot meals it was also possible to bring up the blanket rolls and packs.

In the defense, the men carried their full packs up to their forward positions. In cold weather additional blankets were issued as needed.

The infantry soldier of the British Eighth Army carried a combat pack during all offensive operations, except on patrols and raids. This pack contained a water bottle, mess gear, towel, washing and shaving kit, extra pair of socks, and an emergency ration. The gas cape, which was also used as a raincoat and was very light in weight, was made into a roll and fastened to the top of the combat pack.

The German soldier carried his full pack to his forward position when on the defense, but carried no pack of any sort in the attack.

Chapter Five

ARTILLERY

ARTILLERY

1. *Adjustment of Artillery Fire by High Performance Aircraft (Arty/R)*

The Spitfire and P-51 Mustang, of Reconnaissance Squadrons, were used quite successfully for observation in adjusting artillery fire, primarily fire of long-range artillery. They were used to supplement, and not to replace, organic Field Artillery air observation. The principal advantage of the high performance plane is its greater security against enemy fighters and anti-aircraft artillery. This advantage permits its use in adjusting artillery fire on targets deep in enemy territory and/or in areas protected by anti-aircraft artillery, which the organic artillery plane cannot observe with a reasonable degree of security. However, the Arty/R plane has several obvious disadvantages, such as its fast cruising speed and the necessity for the pilot to act also as observer. It should be employed only on those missions which cannot be successfully accomplished by the organic artillery plane.

The employment of Arty/R aircraft varied with the tactical situation. Its use in support of the attack during the Rapido crossing and at Cassino was quite different from its employment under static conditions. At Cassino a form of continuous patrol and area search was used. On the front south of Bologna, Arty/R was used only on special, prearranged missions against known targets, mostly hostile batteries.

To reduce the danger of surprise by enemy fighters, missions were flown by two planes, one to adjust artillery fire (observer) and the other to observe for hostile aircraft (weaver). The weaver is also responsible for warning the observer of enemy anti-aircraft batteries and friendly aircraft. In spite of our air superiority, the weaver was still considered essential on all missions. Both pilots were briefed as to the missions, furnished maps and photos, and instructed that if the observer

failed to obtain radio contact with the artillery battalion, and the weaver did obtain contact, then the weaver would take over the mission.

Pilots were briefed from 1:50,000 maps and photographs which they carried with them during the mission. Normally, the photographs used were the basic cover photographs taken daily, weather permitting. The target or target area, target code name from the Hostile Battery List, map reference of target, and gun-target line were marked on the photograph in chinagraph or ink. In addition to the above information, special annotations were used to assist the pilots in locating targets and adjusting artillery fire. One method was to mark the photo with range and deflection lines at 100 yard intervals. The range lines were placed over and short of the target and perpendicular to the line of fire. The deflection lines were marked to the right and left of the target, parallel to the line of fire. Another system was to place concentric circles, at equal and known intervals, around the target.

The SCR 522 was used for communication between the Corps Artillery FDC, appropriate artillery battalions, and the Artillery/R planes.

Everything possible should be done to facilitate observation of the bursts (which is more difficult from a high performance plane) and to complete the mission in the shortest possible time. Some of the measures taken to accomplish this were:

a. Use of single rounds of smoke, or HE battery volleys, by caliber smaller than the 8-inch, during the adjustment on a target.

b. Use of battery volleys, with a converged sheaf, during fire for effect on precision fires for destruction. Range and deflection differences were corrected during the adjustment by firing salvos.

c. Correction of range and deflection differences of the individual pieces prior to opening fire.

d. Use of the most precise initial firing data, including metro corrections computed for the individual targets rather

than the check points. Accurate initial data not only speeds up the adjustment but also facilitates marking the target for the observer, which is often necessary.

  e. Use of only one weight of projectile and one lot number of powder charge on the same mission.

  f. Having the battalion FDC give the observer a warning, "stand by", five seconds before and "splash" at the instant the round lands.

  g. Firing all rounds on command of observer.

The operations of Arty/R aircraft during the Rapido crossing and Cassino were an outstanding success. The following is an account of the organization and employment of these aircraft during the first four days of the battle, before the break-through. When the battle became fluid, the normal methods of requesting sorties were reverted to.

A Reconnaissance Squadron was assigned to each corps and each worked directly with the corps counter-battery officer. Though there were some differences, the procedure was generally the same in all corps.

The main enemy gun areas were grouped into sectors and each sector was given a reference letter. These sectors were made to coincide with the fighter-bombing areas, so that it was possible, through ROVER JOE, to bomb them quickly if necessary. Each hostile battery in these sectors was given a reference letter, as were some batteries too far afield to be included in any sector. Certain reference points were also chosen. All this information was marked on 1:50,000 maps and photographs, and a copy of each given to each pilot, including the weaver pilot.

Some squadrons maintained continuous Artillery/R cover from about 0800 to 1900 hours, daily. Others sent up sorties at prearranged times.

The pilot, on getting over the target area, first of all spotted and adjusted fire on any active hostile battery. If there were several batteries active in one sector, he called for fire on all known hostile batteries in that sector. If no hostile batteries

were firing, he would search the whole squadron area, with particular attention to known hostile batteries, and would take those located under fire.

Pilots sent down all information immediately, whether of interest to the artillery only or of general interest. The counter-battery officer passed this information on to ROVER JOE and to Corps Headquarters. This dissemination of general information by Artillery/R sorties was most important and was the main reason why the whole squadron could be used on Artillery/R. When the pilot landed, he was interrogated and a complete Tac/R report was sent to Army Headquarters.

One squadron was able to send up a larger number of sorties than the others because its weavers were provided by a fighter squadron.

One squadron had the added commitment of adjusting naval gun fire. A separate radio frequency was allotted for this purpose. The only change from normal procedure was that prior to the shoot, a puff of black smoke was emitted to indicate the ship which was to fire the mission.

2. Centralized Control of Artillery Air OP's

AOP's should normally be centralized under division artillery or group control; however, they should remain organically a part of the battalion to facilitate decentralization when battalions are sent on independent missions. Battalions should be permitted to call upon their planes when desired.

The group or division artillery air OP officer should be responsible for the administration and operation of the Artillery AOP. This procedure has the following advantages:

a. Fewer landing fields are necessary.

b. Exchange of information between pilots and observers of different battalions is facilitated. Such information as the location of targets and the presence and location of enemy

fighter aircraft and anti-aircraft units should be disseminated without delay.

c. Pilots and observers become familiar with more enemy territory and installations, are more familiar with the enemy and friendly situation in general, and can more readily maintain uniform methods and procedures. Thus, they can work with one battalion as easily as with another.

d. A continuous patrol of the enemy area can be maintained. This is highly desirable at all times to permit detection and fire upon every enemy movement, active hostile battery, and any other activity. This is particularly desirable during a fast moving situation, because it is essential to maintaining contact with the enemy and to preventing his withdrawal by bringing fire on every movement.

e. The group or division artillery air OP officer can be of more assistance to the battalions.

3. Night Observation with Artillery Air OP's

Air observation at night was desirable, but could be obtained only on bright moonlight nights, when there was sufficient light to permit identification of terrain features. On call from the pilot, the air strips should be illuminated with floodlights or improvised equipment. A vertical light beam to guide the pilot to the field was often desirable.

Experimental flights by Fifth Army Air OP Officer indicated that the artificial moonlight produced by the searchlights near the front was not sufficient to permit adjustment of artillery fire from the air for two principal reasons:

a. The reflected moonlight falling into the eyes of the pilot and observer more than counteracted the illumination of the ground.

b. The lights were so far in the rear of the front that the enemy territory was not illuminated sufficiently and to a

great enough depth to permit identification of target and adjustment of artillery fire. To place the lights farther forward would benefit the enemy as much as our own troops.

4. Reconnaissance with Artillery Planes

The liaison plane is one of the big developments of the present war. Its use for tactical reconnaissance to a greater degree is justified and should be adopted. Through its use, Corps, division, and lower unit commanders can be kept immediately informed of enemy movements that might endanger them.

Artillery liaison planes have been used for reconnaissance by commanders of all echelons down to the company. They were acclaimed by all as a superior reconnaissance agency. Their successful use for this purpose has included:

a. Locating targets.

b. Selecting position areas, bivouac areas, assembly points, and lines of departure.

c. Reconnoitering objectives, approaches thereto, and locating enemy strongpoints.

d. Reconnoitering routes.

e. Guiding armored units a cross country.

f. Preventing tank and tank destroyer units from running into traps.

g. Locating demolitions.

h. Following enemy movements in pursuit.

i. Locating front line units in rapidly moving situations.

j. Communication in emergencies.

Preparatory to several of the close-in bombardment missions by medium and heavy bombers, bomber flight leaders and navigators were given thorough orientation flights by artillery pilots in the vicinity of the objective. Artillery aircraft were used to avoid arousing the suspicion of the enemy of the coming bombardment. Because of their low speed, the

artillery planes permitted the airmen to study the actual terrain in greater detail. Also, the Germans were more reluctant about firing on an artillery plane than on a lone bomber.

On one occasion a battalion commander actually commanded and directed a two company raid from his seat in an artillery plane. He had radio communication direct to his ground commander and also with the regimental commander.

The very presence of the AOP in the air neutralized, to a great extent, enemy mortar and artillery fire.

Artillery liaison planes were used to accomplish many of the above missions because liaison planes of the Army Air Forces were not available. The organic field artillery Air OP planes are required for and should be employed only on artillery missions, if possible. Their use for other missions would be obviated by the assignment to division and corps headquarters of organic liaison planes.

5. *Position of Air OP for Observation*

The primary mission of the Artillery Air OP was to locate targets and to adjust artillery fire thereon. To accomplish this mission the air observer continually concentrated on obtaining the best observation possible and at the same time maintained a reasonable degree of safety. The best position from which to accomplish this mission depended upon many factors and it varied, horizontally, from a position above or to the flank of the friendly battery, to one in front of our front lines, and vertically, from 600 to 11000 feet.

The best observation could be obtained when flying at a low altitude above the terget; however, the AOP should fly beyond the range of enemy small arms.

To adjust artillery fire on targets deep in enemy territory or well defiladed, it was frequently necessary for the AOP to fly several miles beyond our front lines.

The best security from enemy fighters was obtained when flying at a low altitude. Several artillery planes shot down in rear areas were hit by German fighters who came from behind

and below. Our pilot should not give the enemy fighter a change to get under him. His safety depends upon maneuverability and the speed with which he can dive for the ground and fly contour or effect a landing. Furthermore, our planes were difficult to see from above, but stood out conspicuously when silhouetted against the sky. Two planes from one division artillery came back with holes through their wings and lift struts. The Germans used a new trick. Two fighters came in from above. The Cubs dived and found two other fighters waiting for them below. All four fighters joined in chasing the Cubs most of the way to their home field.

6. Artillery Air OP Landing Fields

Due to the mountainous terrain and bad weather in Italy, it was frequently desirable and necessary to call upon the Engineers for assistance in constructing or improving landing fields. Fields should be prepared as well as possible to prevent accidents, to eliminate wear and tear of planes, and to facilitate air observation to the maximum extent even under adverse weather conditions. Due to our superiority in the air, the importance of a well constructed landing field was usually given priority over camouflage.

Matting for runways was used to good advantage. Pierced steel planks made the best runways. Sommerfeld and Coir matting, or a combination of the two were also used.

Floodlights to illuminate the field and a vertical beam to guide the pilots were used successfully. With this field lighting equipment, planes can take off earlier in the morning and return later in the evening. With air observation at dawn and dusk, enemy artillery activity, which is usually most prevalent at these times, is greatly decreased. Field lighting equipment also facilitates night flying which is possible on bright moonlight nights.

In selecting a position for an artillery landing field, the following points should be considered:

a. Other conditions permitting, the landing field should

be located near the artillery command post to facilitate exchange of information, communications, and supply.

. *b.* The field should be located out of enemy light artillery range, not only to prevent casualties and damage to the field and equipment, but also to enable the pilots and observers to obtain the maximum amount of rest.

c. The planes must be out of range of enemy small arms while gaining proper altitude.

The group or division artillery air officer must be constantly familiar with the situation and make reconnaissance well in advance for new fields.

7. *Operations Sergeant for Air OP*

An operations sergeant can be used to good advantage at the landing field in keeping a situation map, providing pilots and observers with proper maps and photos, checking communications, obtaining and consolidating intelligence information, etc.

8. *Artillery Air OP Pilot and Observer*

Although it was not common practice, some units developed Pilot-observer teams using regularly assigned observers. The observers were given some flying instruction in order that they might land the plane in case the pilot became a casualty. Parachutes were worn by both pilot and observer when flying combat missions.

9. *The L-5 Liaison Plane*

Experience in the Italian campaign indicated that the L-5 was normally a better plane than the L-4 for use as an artillery air OP due to the following advantages:

a. Greater weight carrying capacity. The L-5 carried the desired weight of equipment and personnel without having its performance seriously affected.

b. Greater speed and faster climbing. Time was saved in going from the field to the observation position.

c. Could be flown in wind of greater velocity.

d. Fewer maintenance problems. Many more hours of flying time could be obtained before the engine needed overhauling. 250 hours were obtained with the L-5. 75 hours was about the maximum for the L-4.

e. Greater fuel capacity with increased cruising time.

f. Better instruments. Turn and bank indicator is particularly desirable for night flying.

g. More room for pilot and observer.

h. Observation from front and rear seat was much better.

i. Equipped for night flying.

j. Greater security from hostile fighter aircraft and anti-aircraft guns due to its greater speed and stouter construction which permitted faster dives.

However, because the L-4 can land on muddy terrain and operate from smaller air strip than the L-5, a certain percentage of the artillery liaison planes should be of that or similar type.

10.   Air OP and the 4.2″ Mortar

Artillery Air OPs have successfully adjusted 4.2″ mortar fire. The firing was primarily on a counter-mortar campaign. A SCR 610, with Division Artillery frequency, was placed with each mortar platoon for direct communication. In addition to counter-mortar fire, the 4.2″ mortars can be adjusted on MG's and other targets that are firing from positions so close to our front line that they lie within the "no fire" zone of the artillery.

11.   Air OP's and the Variable Time Fuze

Danger to Air OPs from the random bursts of the VT fuze necessitated devising a system of clearing the area in which the fuze was to be fired.

In many cases the VT fuze was not used on targets of opportunity, which are the ideal target for this fuze, because of the difficulty and the length of time required to clear the AOP's.

The following system was devised and found to be highly satisfactory. The first time it was tried it took an hour and a half to clear the air. Refinements to this system reduced the time required to less than 5 minutes.

    a. A no Cub line is established parallel to the front.

    b. Centers of gun areas indicated by codeword (in clear) and grid square in which the target is located, are sent to all pilots so that they can get at least 3,000 yards on either side of the trajectory.

    c. All missions for VT fuze clear through Corps FDC.

    d. A series of Code words were developed to indicate the following:

        (1) Request permissions from Corps to shoot VT.

        (2) Order from Corps to clear air along trajectory.

        (3) Permission granted by Corps arty.

        (4) Missions completed to Corps arty.

        (5) All clear from Corps Arty to all battalions.

Sentinels are posted in each battery position when using VT fuzes to watch for friendly aircraft flying in or near the trajectory. As friendly aircraft approaches the danger zone, "cease firing" is given. Firing is not resumed until the aircraft has safely cleared the line of fire.

12. Tanks as Artillery

Mountainous terrain greatly handicapped tank warfare in Italy. Tanks, therefore, were repeatedly used in their secondary role, the reinforcing of artillery fires. Their advantages and problems when used in this role were much the same as those of the self-propelled Tank Destroyers.

13. Tank Destroyers as Artillery

In the Italian theater, the Tank Destroyer battalion was used a great deal in its secondary role of reinforcing artillery

and of direct support artillery. Various methods of attachment for artillery missions were employed successfully. Some of them were as follows:

  a. The battalion was attached to a field artillery group or to division artillery and operated its own FDC.

  b. The company was attached to an artillery battalion and either operated its own FDC or was fired by the artillery FDC.

 The company was usually divided into two six gun batteries rather than three four gun batteries because:

  a. It was possible to remove a gun for maintenance without disrupting fire.

  b. The small caliber of the gun made a greater mass of fire desirable.

  c. Best possible use was made of limited personnel, particularly officers.

  d. It speeded up and simplified fire direction.

  e. It was usually easier to find positions for two six gun batteries than for three four gun batteries.

 On the self propelled gun it was found necessary to lower the rear end of the vehicle to get maximum elevation. This was accomplished by:

  a. Digging the rear-end in lower than the front.

  b. Raising the front end by running vehicle on an improvised ramp.

  c. Selecting a position on a favorable slope.

 Observed fires were habitually conducted by forward observer methods.

 The azimuth indicator on the self propelled TD proved a handicap in the delivery of artillery fires, owing to inherent mechanical defects and the lack of cross leveling devices. Unless the TD was absolutely level, inaccurate fires were

delivered. Initial laying with an aiming circle was much more difficult because the instruments had to be in the same plane as the gun. Reciprocal laying was virtually impossible.

The proven advantages of using Tank Destroyers as artillery were as follows:

    a. Greatly increased artillery fire.

    b. Freed heavier artillery of many harassing and interdiction missions.

    c. Out-ranged divisional light artillery.

    d. Obtained economical use of weapons and manpower otherwise idle.

14. Tank Destroyer Reconnaissance Company

Experience in Italy indicated that the Reconnaissance Company, as such, was of little value to the Tank Destroyer Battalion.

Some of the reasons are as follows:

    a. The Reconnaissance Company was frequently detached and used by higher headquarters.

    b. It was rarely responsible for giving warning of the approach of enemy tanks. This was given by Air OP's, Artillery OP's or the anti-tank warning net.

    c. It presented a difficult administrative problem, because in many cases the entire company was not employed together.

The Reconnaissance Company was used in the Battalion for the following:

    a. It furnished personnel to man artillery OP's. Gun company personnel, if available, would be better for this purpose.

    b. Elements were attached to gun companies to supplement the work of the T/O personnel therein.

    c. Elements were used for area and route reconnaissance but very seldom to select gun positions.

    d. It formed a pool of replacement personnel for labor, communications, liaison, and to man captured equipment.

This made it a general reserve rather than a reconnaissance company, and it was of great value as such, and contributed much to the efficiency of the battalion.

Many officers felt that an air OP Section similar to that of the artillery battalion would be of more value for general and distant reconnaissance than the Reconnaissance Company. Many of the present functions of the Reconnaissance Company could be performed more efficiently by the gun companies if additional personnel were assigned to the gun companies.

15. *Towed VS Self - Propelled Tank Destroyer*

Experience in Italy indicated that the towed TD gun was less satisfactory and generally inferior to the self-propelled.

The towed gun had the single major advantage of being easier to conceal initially.

Some of its disadvantages were:

    a. It could not be effectively manned in the forward combat area. Casualties were excessive.

    b. Lack of communication made control and coördination difficult.

    c. While reasonably satisfactory as a defensive antitank gun, the towed gun, due to its lack of mobility and armor, had little value in an attack, in pursuit, in supporting infantry or armor in local engagements, or in many of the other roles tank destroyers were called on to perform.

    d. While satisfactory as an artillery piece, it required a larger crew a self propelled gun.

The self-propelled Tank Destroyer's advantages over the towed gun were:

a. More mobility for continuous support in fast moving situations.

b. Armored protection for gun crew.

c. Radio in each carrier made communication problems simple.

d. It was ready for action on the move or when it pulled into position.

16. Use of Reduced Charge with 3″ TD Gun

In order that tank destroyer guns might be employed more efficiently in indirect fire missions supplementing Field Artillery, a reduced charge, low muzzle-velocity HE shell was developed.

This ammunition was used in the Fifth Army very successfully. It better enabled the TD to fire close in missions and proved to be very accurate. The 3″ gun being a flat trajectory weapon forced the TD's to occupy positions with very little defilade when serving in the artillery role and using their normal ammunition. The RC shell permitted the occupation of much better positions. The dead space was greatly reduced.

The main disadvantage was that the propelling charge was not great enough to recoil the tube its full length, causing the powder casing to remain in the breach, and requiring that it be extracted manually.

A more complete firing table was required. The table used was fairly accurate, but included neither data for metro corrections, time of flight and drift, nor most of the data necessary for accurate unobserved fires.

17. Employment of the Tank Destroyer as an Assault Weapon

Tank Destroyers were used repeatedly as assault guns in close suport of the Infantry both in rapidly moving situations and during static periods.

Many TD officers felt that this was their most valuable and effective employment. In this role, they were used for the direct support of infantry patrols and for the neutralization and destruction of strong points, pill-boxes, houses, and anti-tank guns.

18.   Use of the 3″ Illuminating Shell

During the action on the Anzio Beachhead need was found for an illuminating shell, and orders were placed for the 3″ illuminating shell for the tank destroyer guns. Although it arrived too late to be of any assistance in that operation, it was profitably used later.

Some of the uses were:

a. To illuminate objectives for friendly patrols.

b. To illuminate targets for artillery adjustment.

c. To expose enemy activity.

Tests proved that from 1000 to 1200 feet was a better height of burst than the prescribed 1500 feet. The shell was ineffective in a fog, and it did not work satisfactorily for distant illumination (10,000 yards or over from the observer) because the flare blinded the observer.

Conclusions from test firing indicated that the following would be other appropriate uses:

a. Surveillance of ″Nite Serenades″ (massed artillery fire).

b. Furnishing direction for infantry units for night attacks. When so used, the flare should be placed sufficiently far in advance of the infantry so as not to expose them.

c. Marking an area for night photography.

d. Marking bomb safety line for night air attack.

e. Harassing of enemy installations.

19. Fire Plans

1. General

It was found essential to consult the artillery commanders of all echelons early in the planning of an operation, as time was required for the development of adequate and flexible fire plans in support of an operation. Timely warning enabled the artillery commanders of Army and Corps to coordinate the fires between corps and divisions, to make plans for ammunition supply, and to balance the amount of artillery available so that the fire power was properly distributed.

Fire plans were governed by the terrain, the amount of artillery available, the amount and types of ammunition available, and by our knowledge of enemy dispositions. They were varied, whenever possible, to insure surprise. Some of the variations were: a false preparation, 24 hours more or less in advance of the attack, no preparation, a preparation in one sector and an attack in another, a long preparation, and a short highly concentrated preparation. It was felt that the enemy could recognize the attacking division by its continued use of similar fire plans.

2. Offensive

Fire plans for the attack were developed in close coordination with the infantry commanders. Plans were made as simple as possible to afford the flexibility necessary to meet rapid changes in the situation. A preparation was used when there was sufficient ammunition and when the element of surprise could be sacrificed without hazarding the success of an operation.

Supporting fires usually consisted of either successive concentrations or a rolling barrage. Successive concentrations were used when the knowledge of the enemy installations was such that they could be effectively neutralized. They were fired on a prearranged schedule or on call. On call was controlled by the forward observers or liaison officers.

211

The rolling barrage was used only when no definite intelligence concerning enemy installations in the path of the attack was available and there was an adequate ammunition supply. A rolling barrage controlled by an artillery observer in position to watch the progress of the attacking infantry was most successful.

In order that counter attacks might be repulsed, defensive fires were prearranged and prepared in depth for each phase line and objective of an attack.

In addition to firing on known enemy artillery installations, Corps long range artillery interdicted routes of approach in order to isolate the battlefield. Medium artillery units of the Corps were also used to thicken organic divisional artillery fire.

3. Defensive

Defensive fires were planned in depth. Concentrations were selected by map study, terrain study and by request of regimental commanders, to cover all avenues of approach by the enemy on the division front back to the infantry regimental reserve lines. The resulting plan was published to all units down to and including battalions. In addition to the overall defensive fire plan, a system of close-in defense was prepared by each direct support battalion to cover its regimental sector. These were the normal barrages. Each battery covered one sector and adjacent battalions were given emergency barrages in the same sector. These barrages were fired in and checked frequently to ensure pin point accuracy. The replot data was sent to Division Artillery which disseminated it to the other battalions. Thus the fire of the entire division could be concentrated accurately on any point threatened.

In a static situation elaborate counter-mortar programs were established. Corps Artillery coordinated a comprehensive counter battery program. These are discussed at great length under "Counter-mortar" and "Counter-battery."

20. Deployment of Artillery in Mountain Terrain

Every effort must be made to disperse gun areas to decrease enemy counter-battery effort and effect. The natural tendency in mountainous terrain is for numerous batteries to become grouped in the few obviously accessible areas. This tendency was defeated by more thorough and detailed reconnaissance and the application of engineer work to develop additional areas for occupation.

21. Artillery Concentrations and Methods of Attacking Targets

Various combinations of projectiles and fuzes were used successfully in concentrations. Smoke mixed with HE percussion and Time shells assisted our infantry in following supporting fires because they could see definitely where our fire was landing. It also had a terrorizing effect on the enemy and led him to believe that concentrations were heavier than they actually were. WP smoke proved to be valuable as a casualty producing and incendiary agent. In one incident, a time adjustment by an artillery battalion forced the enemy into his fox holes. The adjusted coordinates were furnished to the 4.2 chemical mortars which smoked them out. This was followed by a combination of time fire from the artillery and HE percussion from the infantry howitzer company to produce maximum casualties.

The delay fuze was used against houses and prepared positions to force the enemy out into the open where he could be hit with time or instantaneous percussion fire. The technique adopted by one battalion was to attack a building with precision fire and to have the non-adjusting batteries follow the data. When a one-C bracket was split, the two non-adjusting batteries, were loaded for time fire. Then when the building was hit with the adjusting gun, these two batteries were fired immediately, catching the Germans leaving the building by surprise.

Well camouflaged fortified positions, in which individual fortifications and positions were not visible, were best attacked by massed concentrations containing an appreciable percentage of delay fuze. This type of fire did most to disorganize the position and destroy camouflage so that individual positions were made visible and could be attacked singly.

When time permitted, enemy installations such as pillboxes, buildings, bunkers, dugouts, and artillery pieces were best and most economically attacked with a precision adjustment of one gun. A caliber and fuze capable of destruction were used.

Massed surprise Time fire effected by firing volleys timed so that shells arrived simultaneously on the target (TOT) was the most effective method of inflicting heavy casualties on personnel in the open.

Fire on main enemy roads was most effective when a large portion of a road was covered simultaneously with a TOT at a time when it was known to be most active. A linear portion of each road was assigned to each artillery unit, and data was computed to space the fire evenly over that portion of the road. In this manner the organic division artillery could cover about three kilometers of a road in one shoot. This method was more effective against enemy traffic than the practice of confining fires to a single road junction or point on the road, and, in addition, obtained results on military installations and activity to the sides of the road.

22. Maps for Artillery

In the very early stages of the Italian campaign the supply of maps for artillery use was inadequate, but after the crossing of the Garigliano River the map supply was both timely and adequate. To the north of the Garigliano the 1:25,000 map was sufficiently accurate for the securing of artillery fire data. The Engineers also published lists of constant values for each sheet to be applied to the coordinates taken from these maps, in order to come as near to standard grid coordinates as possible.

Slight variations between sheets of the 1:25,000 map of

ARTILLERY

Italy made it impractical to use this map directly for horizontal control. However, excellent horizontal control was obtained when the map was used in conjunction with the 1:25,000 grid sheet.

Later an uncontrolled mosaic covering the same area as the map was printed on the reverse side of each sheet.

Due to the need for speedy map production and to a lack of adequate facilities for multi-color reproduction, the 1:25,000 map was printed in one color only. This made more difficult the securing of vertical control.

Approximately 25 sheets were issued each battalion, covering its area of operation. This number was sufficient. However, when in a static situation for a prolonged period, a few more were required for replacements.

23. Counter-battery

I. INTRODUCTION

The mission of counter-battery is the destruction or neutralization of enemy artillery. This mission was accomplished by reducing the enemy's fire capabilities through the destruction of his artillery weapons, equipment, and personnel. Those hostile batteries not permanently destroyed were neutralized (forced to cease firing) by placing fire on them as soon as they became active, or in case of an impending attack by our troops, immediately prior to the time when they were certain to become active. Counter-battery was the primary mission of corps artillery, and its functions were centrally controlled by the Corps Artillery S-2-Counter-battery Section. Division medium battalions assisted in counter-battery fire when necessary.

Counter-battery was, and must be, continuous. It functioned 24 hours daily, and was not organized merely to support a particular operation, although counter-battery fire was increased, through special counter-battery programs, when supporting an attack.

Although corps artillery fired most of the counter-battery

missions, particularly during the static centralized situations, all artillery was held responsible for the location and destruction or neutralization of enemy artillery, and it must be so trained.

II. ORGANIZATION

The following was the organization for counter-battery in one corps artillery headquarters. The organization in other corps artillery headquarters was similar.

From experience gained in Sicily and Southern Italy, and upon reorganization of the corps under the new T/O while in action at S. Vittore, near Cassino, it was decided to combine the S-2 and counter-battery functions into one section. Experience had proven that general intelligence and counter-battery intelligence are so closely related as to be practically inseparable. Since its reorganization, this section proved to be a smooth-working, close-knit organization, and the combination was considered a most satisfactory utilization of the personnel available.

The Headquarters and Headquarters Battery operated in the following echelons:

　　a. At Fire Direction Center.

　　Artillery commander, executive, and aide; S-2(CBO), S-3, S-4 sections; Headquarters Battery.

　　b. At Corps CP.

　　Assistant artillery officer, an assistant S-2, assistant S-3, assistant S-4, and necessary clerks.

　　c. At Corps artillery air strip.

　　Corps artillery air officer and the air observation section.

　　d. At Army Photo Interpretation Center.

　　Assistant S-2 and clerks.

Personnel and principal duties were as follows:

　　a. Lt. Col., S-2 (CBO): Supervised and coordinated all activities of the section. Kept abreast of the tactical

situation and the plans for future operations. Assisted in formulating the artillery fire plans and coordinated counter-battery programs with adjacent corps.

b. Major, Assistant S-2: Executive of section. Made a thorough and continuous study of the enemy artillery situation. Wrote the enemy disposition paragraph of the Daily Intelligence and Counter-battery Report. Responsible for technical intelligence and files.

c. Captain, Assistant CBO: Responsible for the completeness and accuracy of the hostile battery files and the hostile battery chart. Grouped hostile batteries under code names for defensive fires. Evaluated "shellreps" and conducted normal CB functions. Wrote paragraph 4, Additions and Deletions to Hostile Battery List, and paragraph 5, Miscellaneous (Survey data, outstanding CB missions, etc.), of the daily report.

d. Captain: Stayed at artillery section at Corps CP, and was liaison between Corps G-2 and Artillery S-2 section.

e. Captain, LNO: Remained at Army Photo Center. Assigned priorities to sectors of enemy territory for photographing. Marked all photos of daily coverage with known and suspected hostile batteries, located new targets, and determined effectiveness of our CB fire and changes in known positions. Secured photos for organic AOP and Arty/R missions. Made damage assessment of each "precision shoot" and distributed photos showing the results to the artillery unit and Air OP that fired the mission.

f. 1st Lt.: Responsible for procuring and distributing maps and aerial photos, including basic cover and HB (hostile battery) photos to all corps artillery. Coordinated ground and air zones of observation. Selected targets for night harassing missions. Gathered, evaluated, and disseminated all general intelligence information. Wrote paragraph 1, General Intelligence Information, of daily report. Prepared HB photos for precision shoots by AOPs. Kept S-2 situation map and intelligence bulletins files.

g. 1st Lt. (Aide): Evaluated "shellreps" and performed routine CB duties. Responsible for accuracy of "fire mission" journal and plotting of "shellreps." Made a study of the technique and tactical employment of artillery by the enemy and wrote paragraph 2, Enemy Artillery Activity, of the daily report. Specialized in identification of enemy shells and characteristics of enemy shells and weapons. Selected hostile batteries for AOP and Arty/R precision shoots and those for bombing by fighter bombers.

h. Enlisted Personnel: There were nine enlisted men in the section, including intelligence sergeants, draftsmen, typists, clerks, etc., two of whom worked at the Army Photo Center.

The section operated twenty-four hours a day. All personnel were qualified to perform the duties of several positions.

The Daily Intelligence and Counter-battery Report contained:

a. Paragraph 1 - General Intelligence Information.

b. Paragraph 2 - Enemy Artillery Activity.

c. Paragraph 3 - Enemy Artillery Disposition.

d. Paragraph 4 - Additions and Deletions to Hostile Battery List.

e. Paragraph 5 - Miscellaneous (Survey data, outstanding CB missions, etc.).

III. OPERATIONS

A. LOCATING THE TARGET

1. Locating the Target - General

The first step in counter-battery was the location of hostile artillery. This was the primary duty of the corps counter-battery officer. All hostile battery locations, or information relative to their location, were reported to him. The following were sources of information:

218

a. Photo interpretation.

b. Observed missions (targets of opportunity) by ground OPs, Air OPs, and flash observers of the observation battalion.

c. Sound ranging.

d. "Shellreps" based on analysis of craters and shell fragments, observation of gun flashes or smoke, or sound of shells in flight.

e. Prisoners of War.

f. Partisans and civilians.

g. Captured maps and documents.

h. Radio interception.

i. Hostile Battery files (Recurring and confirming information).

2. Hostile Battery List

The corps counter-battery section prepared and distributed a list of hostile batteries to all subordinate, adjacent corps, and higher artillery headquarters. This list was revised daily through the medium of the Daily Intelligence and Counter-battery Report. The list was divided into two general sections. One section consisted of those hostile batteries (assigned three-letter names) that were definitely located or verified by photo interpretation. The other section consisted of those HBs (assigned two-letter names) that were located by other means, but not yet verified by photo interpretation. A reference name, map (PI) coordinates, number of ·guns, caliber classification, whether field or anti-aircraft artillery, accuracy of location, and status were given for each target. Ordinarily the corps artillery S-3 assigned counter-battery fire missions by names of enemy gun positions taken from this list.

3. Photo Interpretation

Each day, weather permitting, the photo reconnaissance squadron photographed the enemy territory to a depth of approximately 20,000 meters. Sets of these vertical photos were sent to the Army Photo Interpretation Center. An officer

(Interpreter) and two enlisted assistants from corps artillery headquarters worked at this Center. They received information from the CBO relative to known and suspected targets. A list of these was maintained, and they were plotted on a map overlay and marked on the photos daily for interpretation. Information from the numerous sources available to the CBO greatly assisted the interpreter in locating new targets. He furnished the CBO with accurate coordinates (1:25,000 map checked by radial plot) of identified locations. He not only searched for new locations, but also checked known positions to determine whether or not they were still occupied, whether the number of guns had increased or decreased, and the effect of our CB fire.

To assist the photo interpreter in the location and identification of observed hostile batteries, the following procedure was followed by air OPs. Immediately after a flight mission on which an air observer had observed a hostile gun not previously reported by PI, that observer pin-pointed the location on a 1:25,000 map and on an air photo. He reported the location and a description of the target and the time he observed it. Locations were reported by map coordinates and by photo coordinates using a standard photo template (Template "B"). The photo used was identified by number. The following is an example of such a report:

121300A 2/G/L Map coordinate 8235 - 4046
(12 PR) (4M1266) 171 D34 - 624
On east side of small building.

4. Reporting of CB Fire Missions

All counter-battery fire missions not assigned by corps artillery headquarters were reported to the corps artillery S-3 as soon as possible after the battalion commenced firing, so that additional fire could be placed on the target if desirable. The adjusted coordinates and altitude of the target were reported as soon as they were obtained. In addition, all fire missions were reported immediately upon completion. This report included, when applicable, a description of the target,

type of fire (precision or bracket), number of rounds fired, effect on target, and name of observer.

Air observers made a report on fire missions similar to the one they made on hostile batteries located but not fired on. (See Photo Interpretation).

5. Shellreps

The primary purpose of artillery intelligence was to secure all possible information dealing with the disposition, composition, and characteristics of fire of the enemy artillery. A source of important information was enemy shelling. Shelling reports assisted in identifying the source of the shelling. With data obtained from artillery observers, sound ranging and flash ranging units, aerial photograph interpretation, and other sources, these reports gave an accurate summary of the enemy artillery activity, an indication of the apparent importance of hostile batteries, and provided the information necessary for the selection of CB targets. A standard form was utilized in recording and transmitting (usually by telephone) shelling reports. Active enemy batteries were reported by observation of their flash, sound, smoke, or shell craters. As much of the following information as could be obtained was reported:

a. Direction of enemy battery from observer. (Furrow, sound, flash, or smoke azimuth measured from grid north).

b. Estimated range to guns, angle of fall of projectiles, time setting on time fuzes, or flash-bang (number of seconds from time gun flash is seen until explosion of propelling charge is heard).

c. Location of observer.

d. Location of area shelled.

e. Time shelling began and ended.

f. Number of guns.

g. Number of shells.

h. Caliber of shells.

    i. Type of shells (HE, smoke, etc.)

    j. Type of fuzes (quick, delay, time, ricochet).

    k. Type of fire (registration, destruction, neutralization, harassing, interdiction).

    l. Target (Infantry, battery, CP, road, etc.)

    m. Damage.

    n. Name of observer or unit making the report.

It was a responsibility of all personnel to report all available information about enemy artillery activities. Many units organized shellrep teams, equipped with aiming circles and gunner's quadrants when available, which specialized in reporting enemy shelling.

B. ATTACKING THE TARGET

1. Attacking the Target – General

The second step in counter-battery was to neutralize or destroy the enemy artillery that had been located. Based on information obtained from the CBO, the corps artillery S-3 assigned counter-battery fire missions, except for targets of opportunity.

It was desirable to place fire on hostile batteries while they were active for the purpose of forcing them to cease firing thus maintaining neutralization, and to cause the maximum number of casualties by firing on the personnel while they were in the open. For this reason, the counter-battery organization, while centralized, permitted artillery observers to take active hostile batteries (targets of opportunity) under fire immediately without referring them to the CBO. Information relative to the location of hostile batteries, from sources other than artillery observers who could place fire on the target, was transmitted to the CBO immediately, so that he could collate information from several sources, definitely locate the HB, and when possible get artillery fire on it while it was still active. If time permitted, observation on targets so located was obtained. If not, and the target was accurately located, unobserved fire was placed on it. It was desirable that all counter-battery fire,

except on targets of opportunity, remain under centralized control of the corps artillery CBO. With his multiple sources of information, he was better able to determine which HBs were active, which had offered the most opposition in the past, and which were likely to offer the most opposition to future operations. This centralized control also eliminated the waste of ammunition which results when two or more units try to neutralize enemy shelling by process of elimination based on limited information.

When the corps sector was of abnormal width, provision was made for decentralizing counter-battery by the use of sub-sections with the divisions on the flanks.

2. Basis of Counter-battery Fire

a. Observed:

(1) Targets of opportunity (active HBs) by artillery air and ground observers.

(2) Prearranged precision shoots for destruction.

b. Unobserved:

(1) Flash intersections on known locations.

(2) Sound plots on known and unknown locations.

(3) Counter-battery programs in support of attacks.

(4) Night harassing.

3. Methods of Attacking Hostile Batteries

a. *Neutralization.* The enemy was a master of dispersion and of the use of good cover to protect his life. It was found that our artillery concentrations, observed or unobserved, seldom destroyed enemy artillery weapons, and caused few casualties unless the personnel were caught in the open, out of their splendid shelters. Therefore, in static situations artillery concentrations were seldom fired except against *active*

hostile batteries. Continuous air OP patrols, sound ranging, flash ranging, and rapid shelling reports made surprise fire possible.

Counter-battery preparations were fired on all known positions when there was sufficient ammunition and when surprise could be sacrificed without endangering the success of the attack. After H-hour, neutralizing fire was employed on a time schedule against all known positions and against all active hostile batteries.

Concentrations on active hostile batteries were followed by precision fire for destruction when the gun pits could be observed. After the completion of an observed mission, neutralization was maintained for approximately an hour, by platoon or battery volleys at irregular intervals.

Each day the counter-battery section selected the most appropriate hostile batteries for night harassing. These missions were usually assigned to heavy anti-aircraft artillery units.

b. *Destruction*. Examination of aerial photos and captured enemy gun positions, and observation by air OP observers revealed the necessity and value of precision fire for destruction against hostile batteries. Many guns, as well as ammunition and equipment near the gun positions, were damaged or destroyed by this type of fire.

Precision fire either followed observed concentrations on active hostile batteries (targets of opportunity) or was prearranged by the corps counter-battery section. Each day the most appropriate HBs for precision shoots were determined by the CB section and assigned, through the corps air officer, to air OPs. Those missions that could not be accomplished with a reasonable degree of safety by organic air OPs, were assigned to high performance aircraft (Arty/R). The air observers were furnished 1:50,000 maps and were given the map coordinates and an aerial photo of each target. The target, target reference name from the Hostile Battery List, map reference of target, and gun-target line were marked on the photo. In addition, special annotations were frequently

used to assist the observer in locating the target and adjusting artillery fire. One system consisted of concentric circles marked at 100-yard intervals around the target. Another consisted of range and deflection lines at 100-yard intervals drawn perpendicular and parallel, respectively, to the gun-target line. After the missions were completed, photos showing the results of their fire, with the photo interpreter's remarks typed on the back were sent to the observers and firing battalions.

4. Flash-Ranging Location and Adjustment

Flash locations by the observation battalion were reported to the corps artillery S-3 and were taken under fire immediately.

Surprise fire for effect, particularly with VT fuze, was most important. If an adjustment was made, personnel were warned, took cover, dispersed vehicles, and most of the effectiveness of the fire was lost.

If the flash location was a known target previously located or verified by photo interpretation, or if it was a new target located by a two-or-more OP base, and was within transfer limits of a recent registration, surprise fire for effect was delivered without delay. If these conditions did not exist, an adjustment was necessary. To obtain surprise, the adjustment was made on an auxiliary target and fire for effect transferred to the target. Frequently a center-of-impact adjustment was fired, or if no suitable adjusting point existed on the ground, a high-burst adjustment was used.

On all flash adjustments, whether on auxiliary or actual targets, the flash officer reported coordinates of single adjusting rounds or center of impact, rather than sensings of "right," "left," "over," or "short" so many yards. This eliminated the necessity for the maintaining of records of the locations of a large number of firing units by flash centrals in forward areas, and increased the accuracy of sensings.

5. Inspection of German Artillery Positions

a. The artillery commander of one corps initiated inspections of German artillery positions overrun in the corps

zone of action after the crossing of the Arno River. Hostile battery locations that had been taken under fire were examined with the following findings:

(1) Of all the photo locations that were interpreted as containing guns, physical examination of the positions indicated that 85% had been occupied.

(2) Of the 44 locations inspected, excellent effect had been obtained or the area well covered by fire on 29.

(3) Photo interpretation as to caliber and type of enemy guns located proved to be accurate in 75% of the positions inspected.

(4) The employment of the heavier caliber artillery, 155mm howitzers and guns, 8″ howitzers, and 240mm howitzers, accounted for the greatest damage to enemy batteries.

(5) When observers were able to see the enemy guns or pits, destruction of artillery pieces was effected largely by employment of precision methods on visible portions of the target. In the average case where area fire was used, it was evident that little damage had been inflicted on materiel or emplacements.

(6) Excellent weather conditions existing during the period under consideration permitted extensive use of air OPs for the adjustment of counter-battery fire. Planes flying over the enemy lines at an altitude of 5,000 feet facilitated rapid and accurate adjustments. However, inspection of targets revealed that in many cases when observers had reported "area well covered" such was not the case. These erroneous sensings were probably due to the difficulty of observing from high altitudes and to an over-optimistic attitude on the part of the average observer.

(7) During the investigation only two dummy positions were found.

(8) Civilian reports and examination of gun positions indicated that enemy batteries frequently moved when effective counter-battery fire was placed on them.

(9) Inspection of shell craters indicated that the destructive effect occasioned by the use of delay fuze was relatively unimportant and resulted only in a loss of effective fragmentation.

(10) Reinforced dugouts and other types of overhead cover were found in only 50% of the positions examined.

(11) Ammunition pits, slit trenches, dugouts and other battery installations were in general placed 10 to 30 yards to the rear of the gun positions and actually had not been materially affected by the fire.

b. Based on the results of the investigation the following conclusions were drawn and were considered applicable to operations in which only hastily prepared field fortifications are encountered:

(1) Photo locations are sufficiently accurate and dependable to justify adjustment on point locations and expenditure of considerable ammunition without further confirmation.

(2) When guns or gun pits can be observed, precision fire should be used against the individual pieces to effect destruction, followed by battery or battalion volleys consisting of approximately 50% time fire to include fifty yards in the rear of the pieces.

(3) During the evening (dusk to midnight) following an adjustment on an enemy battery, harassing fire on the approaches to the battery position and occasional TOTs with a proportion of time fire on the position itself frequently will cause damage to transport, increase total casualties, and generally interfere with evacuation of the position.

(4) Delay fuze should not be used against enemy batteries in hastily prepared positions, in view of its lack of effective fragmentation.

(5) The report "area well covered", frequently used by air observers in sensing fire for effect, should be used by them with caution, and only when there are definite indications that such is the case.

6. Counter-battery Neutralization Group Plan

The purpose of the counter-battery group plan was to place immediate fire on a number of hostile batteries in an area when information from shell reports was not sufficient to determine exactly the offending battery or batteries.

Hostile batteries were grouped according to their proximity and each group was given a name. The groups were assigned to our artillery battalions and firing data was computed and recorded so that fire could be delivered quickly on call.

24. Counter-mortar

I. ORGANIZATION

1. Purpose

The purpose of counter-mortar organization and operations is the location and destruction or neutralization of enemy mortars.

2. Necessity for Counter-mortar System

Although neglected until May, 1944, when the 45th Infantry Division first initiated a divisional counter-mortar program on the ANZIO Beachhead, the necessity for an efficient counter-mortar system was forcefully impressed upon us by the casualty producing effect of enemy mortars. Approximately 25 per cent of our battle casualties in Italy were caused by German mortar fire. This is second only to the number of casualties caused by enemy artillery, which was about 40 per cent of the total. As the enemy artillery became restricted due to shortage of ammunition and our counter-battery fire, more and more artillery tasks were allotted to their mortars.

3. Principles and Type of Organization

There was no prescribed uniform organization for counter-mortar; however, the organizations in the different divisions were similar. Counter-mortar organizations and

operations were patterned after those of counter-battery, which had been more rapidly and fully developed in the corps artillery headquarters. The principal differences derived from the fact that counter-mortar was assigned as a division rather than a corps function.

In establishing counter-mortar organizations, the following principles were adhered to:

a. The essence of effective mortar neutralization is speed. Therefore, part of the counter-mortar organization should be in each infantry regiment where rapid communication exists between the sources of mortar information and the means of immediate neutralization. A complete counter-mortar section that operates in a manner similar to the corps artillery fire direction center, with the means of locating enemy mortars and assigning fire missions, is desirable in each regiment.

b. A central counter-mortar section should be established in each division, preferably at the division artillery CP, to collect, interpret, and disseminate all mortar intelligence, and to coordinate counter-mortar measures within the division and from outside sources.

c. Counter-mortar activities must be decentralized to lower units in a fluid situation.

Our counter-mortar organizations differed from those of the British primarily in that ours were established with existing personnel and equipment, whereas the British T/Os were changed to provide a Divisional Counter-mortar Organization. As one British general stated, ''We have on the British side produced an organization with War Establishment, or T/O for a Divisional Counter-mortar Organization. Some of you may think that this is lavish and some may think it is insufficient, but the over-riding fact is that the mortar is a great menace and we must be prepared to meet it, even possibly at the expense, in these days of short manpower, of the leading troops. It would be accepting a false sense of security if we allowed this to lapse, because lives saved must be lives gained, and unless you are going to tackle the

problem seriously you are going to go on losing infantry particularly from mortar bombs."

There was a difference of opinion among American officers as to whether additions to the T/Os were desirable and justifiable. However, it was generally agreed that present artillery and infantry communication facilities were adequate.

The 8th Indian Division recommended using special observers whose sole task would be to report hostile mortar activity because "hostile mortars are seldom heard above the din of battle by infantry or artillery forward observers." However, the Commander, Eighth Army, made the following comment concerning counter-mortar OPs. "With regard to the problem of counter-mortar OPs, I agree very much with the Brigadier who said that every Battalion of Infantry should do that automatically. They must have special equipment, like compasses, but I do want to rub in the point that if you specialize too much for every task, then the Infantry Battalion fails to do the job itself, the attitude being that the Brigade Mortrep OPs are doing it. We must be on the watch against always trying to develop a special organization for every little job and the ideal is that every Battalion should report accurately mortar fire. I agree, of course, that special training is required."

The British Divisional Counter-mortar organization provided for nine officers and thirty enlisted men, divided into subsections consisting of a counter-mortar officer (CMO) and staff at division artillery headquarters and an assistant counter-mortar (ACMO) and staff at each brigade headquarters, plus personnel and equipment to maintain communication between the CMO, ACMO, and headquarters of supporting units.

The organization within American divisions was similar to that of the British. A division counter-mortar officer (DCMO) and an assistant division counter-mortar officer were appointed in division artillery headquarters. A regimental counter-mortar officer (RCMO) and an assistant were appointed in each regimental headquarters.

4. Duties of DCMO

    a. Supervised the work of the division counter-mortar section.

    b. Coordinated the work of the RCMOs.

    c. Collected and evaluated mortar information from the RCMOs, photo interpreter, radar battery, observers, adjacent and higher headquarters, and other sources.

    d. Prepared and distributed Hostile Mortar Lists and other mortar information.

    e. Grouped mortar locations for "group" shoots that were fired when the area, but not the definite location, of an active mortar or mortars was known.

    f. Prepared counter-mortar programs, including preparations for attacks, and assigned fire missions.

    g. Upon request of the RCMO, secured additional fire to reinforce the regimental counter-mortar weapons.

5. Duties of RCMO

    a. Supervised the work of the regimental counter-mortar section.

    b. Collected, evaluated, and disseminated mortar intelligence affecting the regimental sector. Reported to the DCMO all activity of enemy mortars within the regimental sector and counter-measures taken (i.e. locations of new positions, known positions that were determined to be active, counter-mortar missions fired, etc.)

    c. Indoctrinated personnel of the regiment with the importance of counter-mortar activities, including the prompt reporting of mortar shelling (Mortreps).

    d. Coordinated observation on enemy mortars.

    e. Coordinated the disposition of weapons under regimental control for use against enemy mortars.

    f. Assigned countermortar fire missions to appropriate units of the regiment.

    g. Called on DCMO for required assistance (i.e. additional information on locations, additional counter-mortar

fire, counter-mortar preparations, counter-mortar programs, etc.).

II. LOCATING THE TARGET

1. General

Enemy mortars were located by the same means as enemy artillery, with one additional source of information, i.e., our infantry patrols. Ground and air OPs, "mortreps", and aerial photos were the most remunerative sources of information. Artillery forward observers reported all mortar activities to the RCMO through the artillery liaison officer at regimental headquarters.

2. Aerial Photos

Aerial photos were used in locating mortars and in precision shoots for destruction in a manner similar to their use in counter-battery. An expert photo interpreter in the division counter-mortar section was considered essential. Because they were more mobile, smaller, and better camouflaged, mortars were more difficult to locate by aerial photography than were artillery pieces. Oblique photos were helpful in locating mortars concealed from vertical view.

3. Mortreps

Mortreps contained the same type of information as artillery shelling reports (Shellreps), and the same standard form was used for convenience in reporting and recording this information. All personnel were responsible for reporting, at once, information concerning enemy mortar activity. When the RCMO responded quickly to these reports he instilled a high degree of confidence in the value of mortreps that had a far reaching effect and rendered his task much easier.

Plotted reports from one or more observers, based on sound, flash, smoke, or crater observation, enabled the RCMO to locate new mortar positions or determine which known positions or areas were active, and to place neutralization fire

on them while the enemy personnel were out of their shelters and manning their weapons.

Experience in combat has shown that mortars can be dealt with effectively if observers report sound bearings immediately. The fact that other details normally included in Mortreps are not available, should not delay their rendition. On receiving two or more sound bearings, it was frequently possible by a study of the map and known locations, to place a concentration on the active enemy mortars in very little time.

Mortars were indicated or located by use of the following:

a. Single back-azimuth rays plus analysis of the terrain along the ray.

b. Single rays plus slope of fall.

c. Triangulation (long-base intersection) from back-azimuths determined in different shelled areas.

A mean back-azimuth, obtained from a group of craters which closely match for direction, will pass through or near the responsible mortar position. Even with no means available for ascertaining the range, the single ray will narrow the search for the mortar and focus the attention of all target locating agencies in the division. The capabilities and limitations of the weapons believed employed, as determined by identification of shell fragments, must be considered. The examination of such areas by air or ground observers or by means of stereoscopic pairs of air photos often disclosed the mortar position.

4. Shell Crater Analysis

a. *General.* An analysis of shell craters and fragments was made to determine the direction and range of enemy mortars. The following characteristics of mortar craters were noted.

(1) The shape of the crater is determined by the angle of impact. A projectile which drops at right angles to the ground will form a circular crater, while one

striking at an angle substantially less than 90 degrees will form an oval crater, symmetrical along the line of the trajectory.

(2) The front edge of the crater (farthest from the mortar) has turf undercut.

(3) The back of the crater is not undercut, but is serrated and splintered, and the ground is normally torn and blasted.

(4) When fresh, the crater is covered with loose earth which must be carefully removed to disclose the firm, burnt inner crater.

(5) The ground around the crater is serrated by splinter grooves which form a definite pattern, the form of which depends on the angle of impact. The intersection of these grooves is the point of detonation.

(6) At the bottom of the inner crater, and in front of the point of detonation, the fuze and fins bury themselves to considerable depth.

(7) The splinter grooves are longest at right angles to the trajectory and shortest along it.

(8) The ends of the splinter grooves form a line at the rear of the crater that is roughly at right angles to the trajectory.

b. *Direction Determination.* Direction was determined by one of the following three methods, or better, by a combination of the three.

(1) The long axis of the oval was determined, a stick layed along this axis and its azimuth was measured with a prismatic compass.

(2) A stick was placed along the line formed by the ends of the splinter grooves at the rear of the crater. Its azimuth was measured and added to or subtracted from 90 degrees.

(3) The point of detontation was determined, the fuze and fin hole located, and the azimuth of a line joining the two was measured.

When time permitted, a number of craters were examined and the mean direction was determined.

A correction was applied to the direction determined as above to compensate for the effect of a crosswind on the flight of the projectile.

c. *Range Determination.* The range at which the mortar was fired was determined from the angle of fall and the caliber of the mortar shell.

The angle of the fall was determined by measuring, with a protractor and plumb bob, the angle between the horizontal plane and a line joining the point of detonation and the center of the fuze and fin hole.

The caliber of the mortar was determined by an examination of the fins.

The range corresponding to the angle of fall and the caliber was obtained from the proper range table for each charge. These ranges were plotted along the mean direction and probable mortar locations were determined from a study of the map and other information as to known and suspected positions.

5. Firing Chart

The RCMO maintained a firing chart of 1:25,000 scale or larger. On it he plotted all known enemy mortar positions, friendly OPs, check points, and counter-mortar weapons under his control.

The position of every observer who was likely to submit a Mortrep was plotted on the firing chart. In static situations, OPs were accurately located and instruments oriented for direction according to survey control common to the firing units. Among other advantages, this facilitated accurate reports on azimuth of enemy mortars. Sound, flash, and furrow (crater) azimuths were plotted on an overlay and mortar positions were determined by intersection.

The location of friendly weapons under the direct control of the RCMO were accurately plotted so that deflections and ranges could be measured for fire missions.

III. ATTACKING THE TARGET

The location of the enemy mortar or mortar area having been determined, a decision was required as to the weapons to be employed for neutralization or destruction. Three types of weapons were available: fighter-bombers, artillery, and mortars. For most rapid results, the RCMO usually employed those weapons under his direct control and called on the other weapons, through DCMO, only when necessary to accomplish the mission.

The RCMO had available for counter-mortar fire, the 81-mm mortars, the 105-mm howitzers of the infantry cannon company, 4.2-inch chemical mortars when attached, and fighter-bombers on request to ROVER JOE. The DCMO had available the division artillery, and corps artillery on request.

Enemy mortars, accurately located, which could not be attacked by other weapons, were assigned to fighter-bombers. A photo of the mortar position was furnished the pilot and the target was marked with colored smoke. The Commander, Eighth Army, made the following comment on the use of fighter-bombers for counter-mortar. "In operations on land you want every form of support you can get. To give an example of how the Air Force must take on targets which at first sight appear suitable for artillery, I think mortar areas are very suitable for air bombing. All of you have seen, after occupying ground, enemy mortar positions untouched, and we have seen from diagrams how difficult it is to get at enemy mortar positions. In these deep ravines, in sunken lanes where the enemy always get their mortars behind high banks, etc., the bomb is a very effective instrument. Mortar areas, therefore, should be bombed when you have accurately located them."

Artillery was excellent for counter-mortar, but had certain limitations, especially when fire on enemy mortars close to our own troops was desired.

The 4.2-inch and 81-mm mortars were perhaps the best weapons to use against enemy mortars.

The 4.2-inch chemical mortar units were most effective in counter-mortar when trained in artillery methods, attached to the artillery for fire control, and employed in at least company strength for massed fire.

The 81-mm mortars maintained separate range cards for countermortar shoots with all information necessary to open fire upon call from the RCMO giving only the lettered designation of the target. The following is an interesting account of fire control in a mortar platoon.

"We have been very successfully using a method of fire control and direction similar to that of an artillery fire control center. Our first attempt with this method was an experiment at ANZIO Beachhead and it proved itself so effective that we have been using it ever since. The only items necessary to operate this CP set-up which are not T/E are 1/25,000 artillery grid sheets and a 1/25,000 range-deflection fan.

"As soon as our mortars are in and their position plotted on the grid sheet, they are registered on a base-point. It is then unbelievably simple for the platoon CP to fire on any given coordinate quickly and accurately by using the range fan which immediately gives the true range of the target and correct deflection from base point. Therefore, any person in the battalion can call in the map coordinates of a target and the target can be fired accurately and immediately. This method has been extremely valuable in firing targets where observation was difficult and even more so for night firing. All of our NCO's have worked with this method and are thoroughly trained to take over operation of the CP if the platoon sergeant should become a casualty."

Generally, the principles and technique of attacking enemy artillery were applicable to counter-mortar fire. Counter-mortar concentrations seldom damaged or destroyed enemy mortars, so they were fired only when the enemy mortars were active, to produce the maximum number of casualties and to force the enemy to cease firing. High angle and time fire were most frequently used for neutralization. A

large percentage of counter-mortar fire was unobserved. Precision fire for destruction was employed as in counter-battery.

In preparing counter-mortar programs, the DCMO grouped the known enemy mortar locations according to type of weapons and tactical formation, and gave each group a code name. When a Mortrep was received that identified a certain group as being active, but did not definitely locate the responsible mortar or mortars, the entire group was taken under fire.

25. Six-Gun Batteries for Light Field Artillery

The experience of two divisions of the Fifth Army has proved that the six-gun battery for light artillery is feasible and highly desirable. It is more flexible rather than more cumbersome.

From a tactical standpoint the main advantages are as follows:

> a. More effective defensive fires.

> b. Wider effective battalion zone of fire.

> c. Greater shock action.

> d. Better support during displacements by echelon.

> e. Less percentage of loss of fire power when one or more howitzers are out of action.

> f. Handling of sheaf simplified by using center platoon for adjustments.

> g. Battalion fire power increased by 50%, with less than 15% increase in personnel.

> h. More fire missions may be handled simultaneously.

No increase in ammunition expenditure is expected. It was found that often one battalion volley effectively covered the target area when two or more would have been used with the

old four-gun batteries. The battery executive can effectively control six guns.

The disadvantages that have been encountered are of such a minor nature that they are not worth mentioning.

26. *Heavy Anti-Aircraft Artillery in Ground Role*

Allied air supremacy in Italy made it possible to employ heavy anti-aircraft artillery units on their secondary mission of reinforcing artillery fires. The 99mm AA gun proved itself a valuable weapon against ground targets because it has:

a. 360° traverse.

b. Comparatively long range (19,000 yards).

c. An extremely high MV.

d. A very rapid rate of fire, up to 20 rds./gun/minute, and,

e. A solid gun mount which does not lose orientation in firing. Better results would have been obtained, however, had a satisfactory smoke shell been available for this gun.

Fire on ground targets was governed by the following:

a. Firing was not allowed to interfere with primary anti-aircraft missions, unless the battery were assigned a purely FA role.

b. Missions were furnished by the supported Field Artillery unit, normally to the 90mm battalion FDC. Under certain conditions the 90mm battery was attached to a FA Battalion for fire missions. .However in this case the AA battery operated its own FDC.

c. Only targets appropriate to the 90mm were fired. These included all targets appropriate for light artillery, but beyond its range.

d. Area coverage, except in unusual cases, was avoided.

e. Whenever practicable all fires were observed..

f. Fuze M67 was not fired on unobserved missions.

g. Battery positions were accurately located by approved survey methods. Each 90mm battery had trained personnel and the proper equipment to perform its own survey.

27. *Artillery Support of Bombers*

It was found desirable and effective to fire all counter-battery artillery available on hostile anti-aircraft artillery when our bombers were required to fly within range of these enemy weapons. The amount of flak encountered by our aircraft was thus materially reduced. The targets, number of rounds, and approximate time to fire these missions were furnished to artillery battalions. The battalion then fired on call from their observers who had been alerted to watch for our aircraft. Due to the limited amount of artillery and ammunition available, one target was usually assigned to each artillery platoon. Air OPs performed surveillance missions during the bombardment and took enemy anti-aircraft batteries under fire when they became active.

28. *Artillery Training*

Battle experience has indicated that field artillery units, which are well trained basically, become careless of details under combat conditions, with a resulting loss of efficiency. Training should be continuous whether in combat or not. Schedules should be prepared by periods, rather than for definite days and hours, so that the continuity of instruction will not be interrupted by combat duties. Accuracy and precision should be stressed in this training.

Artillery liaison officers and forward observers should be very carefully selected and trained. The importance of their work was frequently underestimated by their commanding officers. Too often little attention was paid to the selection and training of these officers. Often, the last officer to join

the organization was more or less automatically assigned to these duties. The liaison officer and forward observer must be thoroughly familiar with the artillery picture, including corps artillery. They must know what artillery is available and its fire possibilities. It is hard for them to realize how much artillery is backing them up. They tend to think only of division artillery and forget how easy it is with our fire direction system to get additional help. One infantry regimental Commander stated, "The infantry doesn't realize how much artillery is available to them. Until this action (battle for Rome), I thought only in terms of division artillery, but once I found out what I could get, I certainly made use of it. The 8-inch howitzers and 155-mm guns could be brought in to help us without any trouble. This was a revelation to me and I know the other infantry commanders felt the same way."

The need for training in the following subjects was indicated:

a. Counter-mortar and counter-battery.

b. Local security.

c. Destruction of materiel in event of imminent capture.

d. Disarming of anti-tank and anti-personnel mines.

e. Artillery liaison.

f. Use of maps and air photos.

g. Night flying and night adjustment of fire from air observation posts.

h. Close cooperation between air OPs, tanks, tank destroyers, and self-propelled artillery in fast-moving situations.

i. A more thorough understanding of infantry tactics and capabilities of infantry weapons by artillery officers and of supporting artillery by infantry officers and non-commissioned officers. All infantry officers and non-commissioned officers should know how to adjust artillery and mortar fire.

29. Artillery Use of Colored Smoke

Colored smoke was used almost exclusively to mark targets for bombers. At times, the enemy confused the air pilot and observer by firing the same color into friendly areas. This made it necessary to use a prearranged code system such as:

a. Ladder: three smoke rounds fired in a line 100 yards apart, the center designating the target.

b. Box: four white smoke rounds forming a two hundred yard square with one colored smoke round in the center designating the target.

c. Alternating white and colored smoke rounds on target.

Several colors were used, however red smoke seemed to be the easiest to see under all conditions. Blue and violet were hard to detect against dark backgrounds. Yellow was not used for marking enemy targets because it was approximately the same color as mustard gas and furthermore had an acrid odor.

Air bursts were essential. Percussion bursts were poor and had the additional disadvantage that shells ricochetted before functioning.

30. Smoke Element in HE Shells

The following points summarize the opinions of a majority of the artillery officers on this subject:

a. The addition of a smoke element in all artillery HE shells, to facilitate adjustment of fire, is not desirable.

b. Separate smoke and HE shells of comparable ballistic qualities provide a more desirable solution for the 105-mm and 155-mm howitzers. In organic division artillery units, it is believed that the addition of a smoke element would reduce visibility on the battlefield when a great deal of firing was in progress. Any reduction in lethal effect necessitated by the addition of a smoke element is not considered justifiable.

c. It is not thought that a smoke element is needed for the 155-mm, 8-inch, and 240-mm howitzer shells.

d. The addition of a smoke element in HE shells of long range and comparatively small caliber weapons, such as the 3-inch, 4.5-inch, 90-mm, and 155-mm guns, is desirable.

31. *Flash Reducer M1 for the 155mm Gun*

The Flash Reducer has proven highly successful in reducing the flash from the 155mm gun and consequently, the amount of enemy shelling of our gun positions. However, several serious accidents occurred while using the Flash Reducer. In these the tube was sheared off at the breech ring and the rear end of the tube and breech mechanism blown to the rear. Although the tubes may have been defective, the Flash Reducer was probably a contributing factor in that it causes an increase of pressure in the powder chamber. In order to reduce the chances of similar accidents, the Artillery Headquarters of Fifth Army prohibited the use of the Flash Reducer with super charge, using it only with normal charge.

A VE correction for the Flash Reducer is necessary and should be determined by registration. With a new tube, the correction is approximately—25 f/s for supercharge and —10 f/s for normal charge.

32. *High Angle Fire*

High angle fire added materially to the capability and flexibility of artillery in mountainous terrain. In many instances close support would have been impossible without its use.

High angle fire has proved to be dependable and accurate with no undue dispersion; however, separate corrections were determined when both high angle and low angle fire were fired in a given sector.

The principle advantages of high angle fire were:

a. It practically eliminated dead space.

b. The "nerve racking" noise of shells passing closely over heads of supporting troops on crest was reduced by high angle fire.

c. Against occupied buildings, 105mm high angle fire with delayed fuzes was more effective than low angle fire with the same shell and fuze.

d. Danger from random burst of the VT Fuze was minimized.

33. The 12-inch Graphical Firing Table

Most of the artillery units of the Fifth Army were issued the 12" graphical firing table; however, very few used it for fire direction work. Those that did, preferred it to the 18" graphical firing table because:

a. It was not necessary to change slides when changing charges.

b. It was small and compact.

c. At extreme ranges, the elevation scale was easier to read.

d. It indicated fuse burning time up to maximum range.

The units not using the 12" graphical firing table, but using the 18" M4 GFT, disliked the 12" rule for fire direction work for the following reasons:

a. The larger M4 GFT was easier for computers to handle and was more easily read, particularly in poor light, because the indicator on the 12" rule was lightly frosted.

b. Corrections had to be carried on the indicator of the 12" rule, and where there were several corrections to carry simultaneously, confusion resulted.

c. Having no carrying case provided for the 12" GFT, it was exposed to dirt and damage.

The 12″ GFT was used principally by forward observers. It was ideal for this work because of its smaller size and handier construction.

34. Use of '17 - '18 Ammunition in 155 Howitzer M1

During the summer of 1944 an acute shortage of ammunition for the 155mm howitzer M1 developed. However, there was on hand a great deal of ammunition for the 155mm howitzer M17-'18. As there were no firing tables for this combination of weapon and ammunition, test firing to produce tentative tables was conducted by two Medium battalions. One set up a firing range and fired a series of Center of Impact into the sea. About 500 rounds were fired and a table developed for low angle fire. The other battalion used similar methods and produced a table for high angle fire. The Firing Table FT. 155 - V-1 was used to obtain factors for Metro corrections.

Results were sufficiently accurate to enable other units in the army to use this combination with excellent results.

35. Use of Captured Artillery Materiel

The German 150 cm Gun Howitzer and the 88-mm AA and AT gun were both used against the enemy. The problems were many and Ordnance officers felt that the results did not justify the efforts put forth to keep the guns in action.

The principal disadvantages were:

a. The lack of spare parts and equipment.

b. Ammunition problems, lack of proper components.

c. Improper prime movers, brakes, pintles, etc.

d. Necessity for adaptions and improvization to get the piece into action initially and to keep it in action.

These pieces were used mainly for harassing and interdictory fires; however, some observed precision adjustments were fired with good results.

36. Photo Template B

A device for quickly transferring photo references was urgently needed. A transparent template with a grid superimposed on it was developed by the Fifth Army and placed in general use in the Italian theater.

To read a photo reference, the center of the template was placed over the center of the photo; collimating ticks on photos permitted identical positioning. The template could not be used if the photo did not have the ticks.

Inasmuch as all units had like photos and like templates, no great problem was encountered in coordination. Its use was largely to transmit targets by coordinates from Army, Corps or Division to Tac/R squadrons for Arty/R shoots and to AOP fields for their use in target identification and adjustment.

37. Camouflage of Artillery

Our artillery frequently was not camouflaged sufficiently to prevent its location by enemy observers; however, issue materiels were felt to be satisfactory.

Several 105mm howitzer batteries combined weather protection for gun crews and camouflage by pitching a pyramidal tent over the gun and gun pit and placing a camouflage net over the tent. The howitzer was fired through the door of the tent. This arrangement was very satisfactory in keeping personnel and gun pits dry during inclement weather.

Battalions needed additional materiels to assist their snow camouflage. Camouflage nets were removed and the guns and surrounding sandbags were painted white; however, this was not considered adequate as the footprints of the crew, the blast marks, and the shadow still existed. A white materiel that could be used as a net was suggested. Vehicles and tentage must also be taken into account in considering any modifications or supplementary materiels for winter camouflage.

38. Artillery Notes from Battle Experiences

1. We shot on too many unremunerative targets. Rounds were wasted on suspected targets. Consequently, the problem of supplying ammunition and new tubes was made more difficult.

2. There was a great need for improvement in the accuracy and frequency of meteorological messages.

3. Too many lot numbers of ammunition issued to one battery decreased the accuracy of artillery fire.

4. The rounds fired by the pieces (tubes) within a battery should be distributed approximately equally among them, in order to keep the ballistic effect of wear uniform. Where practicable, the relative erosion effect of different powder charges should be taken into consideration.

5. A network of numbered reference points selected and issued by corps or division artillery commanders down to companies and artillery forward observers simplifies the indication of targets and reporting of friendly locations.

6. Artillery concentrations against German tanks were effective. Even if direct hits were not obtained, the tanks almost invariably withdrew.

7. Greater speed and accuracy were obtained in battalion observed fires when the two computers for the non-adjusting batteries followed the sensings and computed their own corrections, each using his own "C" and "100/R" factors. When the command, "Fire for effect" was given, each computer sent his final commands without the necessity of the adjusting computer totaling and announcing his corrections.

8. Convoys should move at the most rapid rate possible when subjected to enemy interdiction fire.

9. During the early stages of combat some units dumped too much ammunition at forward positions which later had to be abandoned. When it was necessary to leave ammunition at old positions, units should have picked it up later or reported its location to the proper ordnance agency.

10. The issue of maps should be coordinated closely by the Army Artillery Officer. Units must all use the same editions unless the Engineers specifically state that the latest edition can be used concurrently with a preceding issue.

11. Photographic requirements should be anticipated, and requests made for delivery well in advance of the time they will be required.

12. Experience indicated that any attempt to standardize completely communication for all units was in error. Special situations arose constantly which necessitated special equipment. Extra switchboards and radios (SCR 193, SCR 522, SCR 608, SCR 610) should be kept in reserve by Corps and Army to meet special requirements.

13. In a fast moving situation, wire could not be recovered by artillery units with the personnel and equipment authorized by the T/O & E's used during the campaign.

14. The more mountainous and rugged the terrain, the greater the need for Air Observation Posts.

15. Light smoke hazes were successfully used to conceal our movements from ground observation. Care was taken in siting smoke generators that essential air and ground observation for Anti-Aircraft Artillery and Field Artillery weapons was not seriously curtailed.

16. Experiments with the Firing Platform M1, which provided 360 degree traverse for the 155-mm gun, found it to be impractical in mountainous and muddy terrain. The time required to install and remove it was excessive. Also, two additional 2 1/2-ton trucks were required to transport it.

17. In mountainous terrain and on trails with many sharp curves, the M10 Trailer was unsatisfactory. Its added weight and lack of springs were additional factors against it. The M10 Trailer could be used only for hauling ammunition and the regular 1-ton trailers could perform that mission without the above deficiencies.

18. The normal procedure of obtaining adjusted (replot) coordinates and altitudes for the massing of additional artillery often resulted in false replot data in mountainous

terrain. The following method is one suitable solution:

a. Site was not changed during the adjustment unless the observer called for a very large shift. If a large shift was made (500 yards or more), the target was given a new initial plot and a new site was determined.

b. After the adjustment was complete, the site and the range and deflection corrections (computed for the adjusted range) were stripped from the adjusted data, a replot made, and the adjusted coordinates determined.

c. The altitude of the target was determined by multiplying the site (minus complementary angle of site) by the range (in thousands of yards) to the replotted target. This altitude in yards was converted to meters.

d. Other units using this adjusted data selected a charge giving a slope of fall comparable to that of the adjusting unit.

19. A completely developed and coordinated system of ground observation was possible during static phases of operation. It was a great aid in fire control, accurately locating targets, and developing the best possible ground observation across the division sectors. A number of coordinated observation posts across the front, with instruments which were accurately located and oriented for direction according to survey control common with the firing batteries, offered the following advantages:

a. Possibility of high-burst or center-of-impact registration at night or at other times when poor visibility did not permit observation of regular check points.

b. More accurate reports on azimuths of enemy gun flashes and activity.

c. Possibility of locating targets by intersection.

d. Ability to calibrate artillery pieces from tactical positions.

e. All observation personnel were informed as to the location of all OPs. This kept dead space to a minimum, and various combinations of OPs could be employed to form a base for observing a certain area.

Chapter Six

SIGNALS

SIGNALS

1. Friendly Hazards to Wire Circuits

Vehicles constituted the major hazard to field wire circuits from friendly sources, particularly where wire had been carelessly laid along shoulders of roads. Tracked vehicles were a particular nuisance because of their ability to leave roads at any point. Between 80% to 90% of the faults from friendly sources were due to vehicles. Engineer activity (blasting, road clearance, detonation of mines, etc.) accounted for a portion of the troubles. Cable circuits underground were damaged in some instances by engineer work on roads and culverts. It became SOP to furnish Army and Corps Signal and Engineer Officers with route plans of underground cable and main overhead arteries. Engineers quickly learned to notify signal officers of intended work which might endanger lines, in order that steps could be taken to prevent this damage.

2. Cabling of Field Wire Circuits Along Highways

Cabling field wire circuits along main axes was a general practice instituted at the request of staff officers to improve appearance along roads. While such cabling prevented some troubles, and improved appearance, it actually did not improve service. On the other hand it made trouble shooting a very difficult task, and made it impossible for units to recover wire. Cabling should be done only through towns and at overhead crossings. At other points wire should be laid off the road and should be policed and kept off the road but not cabled.

Cabling of field wire was also found to be inadvisable by British formations in forward areas. Spaced D8 (9" spacing between wires) circuits by their nature make cabling impossible.

3. Method of Tagging Field Wire Lines

The practice outlined in FM 24-5 was found to be entirely satisfactory by U.S. units.

British Formations, however, were not satisfied with their line tagging (labelling) method.

The existing type of British wire tagging (line label) had certain disadvantages. It was too bulky. Linemen could not conveniently carry enough. It required a separate piece of spun yarn to affix—this wasted time.

The following design for an ideal wire tag for British use was suggested:

It should not be larger than 2½″ by 1½″.

It should be shaped for different arms of the service and different levels. This assists rapid identification.

It should be fabricated of light thin plasticised wood or cardboard, but rough for easy inscription.

It should have two small lengths of copper wire, permanently attached to the label, for rapid affixation to the line.

A system was designed in Eighth Army for the marking of wire tags, using the Signal Office call signs (telegraph call sign - See Sig. Trg. (All Arms) 1938 Appx 1) of the unit concerned, plus a serial or circuit number. The method was found satisfactory.

At points where several lines were labelled together and where linemen could achieve ready access to the lines for testing purposes, larger-numbered notice boards were erected. The locations of such points, and the board numbers, were recorded on the cable route plan kept by the Signal-master (Communication Officer) or Fault Controller. By this means coordination and control of maintenance parties was greatly facilitated.

4. Repeating Coils in Trouble Shooting

One unit placed a repeating coil in the center of a line running cross country over a mountain. In event of trouble a resistance check immediately revealed on which side of

center the fault lay so that only one team had to go out on the trouble. A repeating coil, obviously, cannot be used in this manner on a simplexed line.

5. Applicability of Wire W-143 (U.S. only)

W-143 was designed for use in communicating over distances greater than the range of W-110B where other long range facilities are not available. W-143 proved quite satisfactory when used properly. It is a much more delicate wire than W-110B and must be carefully laid. When its use is contemplated, consideration should be given to the above. It will often be more expedient to use repeaters, particularly where the requirements are of short duration. If W-143 is used, linemen should be cautioned not to use test clips in checking lines. The minute holes caused by the clips allow the graphite covering to come in contact with the conductors, causing partial shorts. Overhead construction is recommended with W-143 whenever possible.

6. · Wire Net recommended for Infantry Rifle Company

In many situations it was evident that infantry rifle companies needed a wire network. This was particularly true in a static situation when it became highly desirable to establish wire communication with each platoon, OP and · the CO. Replacing the CE-11's with TP-3's and providing a small, light weight, six drop switch board would give the desired result with a minimum increase in equipment.

7. Wire Equipment and Personnel for TD Battalions (U.S. only)

Tank Destroyer Battalions employed in their basic role needed no more wire equipment than T/E allowed. However, TD's were employed quite extensively as artillery in which

case considerable wire equipment became essential. TD units were supplied with excess signal equipment throughout the Italian campaign. Personnel to operate this equipment presented a great problem and one which was not solved satisfactorily. Drivers, radio operators, etc. were employed as wire personnel and in many cases functioned in both their original and secondary capacity. The following is a general statement of the requirements of a TD battalion:

a. Within the platoon a suitable fire control wire system was set up by using the RM-29s at the SP guns and a EE-8 phone at the platoon. A phone was also required for use to company. W-130 reels mounted on each SP vehicle were satisfactory for laying wire. Additional personnel were not required.

b. Each company except the reconnaissance company had a BD-71, RL-31, RL-27 and sufficient EE-8s for two locals, a test phone and OPs. Personnel sufficient for installation and maintainance was obtained with difficulty from within the company.

c. Battalion required a BD-72 at the forward CP and a BD-71 at the Service and Supply installation along with necessary personnel and equipment for installation and maintenance.

8. Techniques Employed in Effecting Wire Communications during River Crossing Operations

River crossing operations demanded utmost reliability of communications, which necessitated careful prior planning. Wire communication was not normally established until Battalion CPs had moved across.

Before the operation, lines were layed forward to as near the Battalion crossing points as possible. Alternate routes were chosen to reduce the danger of dislocation of communications by enemy fire. At the time of the assault, these lines

were quickly extended to the river bank, where manned test points were established. Several crossings were then made, each containing sufficient pairs for the full set-up, in order that circuits could be quickly switched in the event of damage to the main crossings. Crossing points were kept well clear of proposed bridging sites where possible.

The actual technique of effecting the cable crossing depended to a very large degree on the nature of the river. It was found better to suspend wires above water level where this was practicable (rivers up to 75 yards in width). Initial suspended crossings were normally made with field wire. Rubber covered cable was sometimes used for submerged crossings in the early stages. Where suspension was impracticable owing to the width of the river, it was necessary to sink the wire. New field cable and spiral four or quad cable were satisfactory for immersion, and gave satisfactory results. When it was proposed to make an immersed crossing, the necessary number of field cable pairs or rubber covered cables were prepared beforehand into single ropes of the required length, bound securely at small intervals. Such ropes, with plenty of spare length for end terminations and other unforeseen difficulties, were wound on special reels ready for use. It was essential to use sinkers to ensure that the wires lay on the bed of the river and were thus less subject to the "drag" of the current. Sinkers tied to the "ropes" were placed at short distances from either bank and spaced at equal intervals of approximately 50 ft across the river. A useful form of sinker or cable anchor is an ammunition case which can be filled with gravel or stones at the river bank. A further method of sinking the wires, which was tried, was to bind a heavy steel messenger wire with the rope of cables to be immersed. This had the advantage that the strain at the bank anchors was taken by the steel messenger and not by the wires. It was also found advisable to bury the wires from the shore anchors down the river banks, to a point just below the point of entry into the water.

One of the main difficulties encountered in effecting wide

river crossings was the handling of the assault boats used for the crossings by inexperienced communication personnel, who were at the same time struggling with reels and other cable laying impedimenta in the boat. In the case of some river crossings made in Italy, very strong currents were met, and considerable difficulties were encountered in navigating the required course. A need was felt for special assault boats, *fitted with outboard motors* and each in charge of an engineer coxswain, for allotment on a scale of one per assaulting brigade (Brit), or regiment (U.S.). As it was necessary to keep cable crossings well clear of proposed bridging sites and infantry crossings or ferry points, it was necessary for all crossing parties to carry mine detectors.

9. *Availability of Organic Personnel for Recovery of Abandoned Field Wire*

U.S. experience demonstrated that an infantry division, even in a slow moving situation, could recover not more than approximately 50% of its field wire. In a rapid advance it was necessary to abandon all field wire. Corps, in a rapidly moving situation, were forced to leave circuits on the ground. but in most cases would send crews back to recover such wire. Normally Corps Signal Battalions could recover all wire they laid, as could Army Signal units.

The practice in Italy was, in static situations, to utilize personnel from Corps and Army Signal Battalions to recover wire abandoned during a previous rapid movement.

Lack of sufficient wire personnel in British units above regimental level made it impossible for these to make a general practice of recovering abandoned field wire using organic personnel.

The only units who succeeded in doing this were Dominion units who had a larger proportion of linemen, and Signal Sub-units working with artillery who also had more linemen per mile of wire laid.

Personnel were not left behind to recover wire unless it was

unlikely they would be required for forward laying for a considerable time. This was necessary because in both British and American units, especially below Division level, limited numbers of wire personnel made it essential that adequate rest periods be allowed whenever possible. When personnel were required for forward laying it was important that they were fresh and located forward, where they were required.

Recovery teams, made up of unskilled Italian personnel under the supervision of Allied military personnel and furnished with military equipment and transportation, were organized to follow up and recover wire in rear of Corps. This proved very satisfactory and during rapid movement was the primary means of wire recovery. For administrative reasons Italian military personnel were found to be more satisfactory than civilians.

10. Assignment of Telephone Code Names

U.S. units agreed that telephone code names should be assigned to all organic units of corps and divisions, and to units normally assigned to these organizations. Practice at Army was to assign code names to units served from the Army switchboard only if such units had a switchboard. For units with only a telephone, the unit designation was used. This proved more efficient than to attempt to assign code names to all units served from an Army board.

It was not the practice in the British Army to use telephone code names, except when operating under command of U.S. formations. In the latter case, no great difficulties were met in the adoption of this procedure, but it was not generally felt that the universal use of telephone code names should be introduced into British practice. Regimental names of British units help the routing of telephone calls in the same way that code names assist in the U.S. Army. The introduction of telephone code names into purely British practice was only used in the case of switching centers in forward and rear areas.

11. Necessity for "Priority" Telephone calls (U.S. only)

The use of URGENT and PRIORITY calls became necessary in order that congested lines would not hold up highly important conversations of operational nature between key staff personnel. The use of URGENT in classifying a call was limited to key personnel particularly authorized to make this classification.

In headquarters of divisions and below, the PRIORITY type call was not generally accepted, the feeling being that at that level a call could be classed as URGENT or would not be important enough to deserve any priority rating.

At Corps or higher headquarters the PRIORITY call became essential in order that important traffic, not necessarily operational in nature could be cleared efficiently. The PRIORITY call was always a booked call and the originating party was given a circuit as soon as one cleared. Circuits were not interrupted for a PRIORITY call.

12. Use of Telegraph Sets within a Division

The TG-5 was not used by U.S. units. Staff officers became accustomed to, and dependent upon, extensive telephone systems, using them even though messages sent by telegraph would have in many cases served the purpose equally well.

The British Army made wide use of their equivalent of the TG-5, the Fullerphone, in communication systems below Corps level. In the British Army its use was SOP between Division and Infantry Brigade but not between Infantry Brigade and Infantry Battalion or between Division Artillery and Artillery Regiments. There was, however, an increasing practice of using telegraph between Division Artillery and Artillery Regiments, and in static conditions it was usual to employ telegraph on Infantry Brigade to Battalion links.

13. Practicability of Teleprinter Switchboards at British Army Group and Army (British only)

Army (U.S.) habitually used teletype switchboards at both echelons of army headquarters. Army (Br) did not use teletypewriter switchboards, except for switching DAF (Desert Air Force) circuits. Army Group (Allied) occasionally used a switchboard for teleprinter circuits, but never for its teletype circuits.

"British experience indicated that, provided an efficient TER* procedure is organized considerable advantage is gained by the use of a teletype switchboard at Army Group.

"At Army the proportion of "through" messages was small, and the links were normally worked to capacity during busy periods. Since these links were fully loaded with other than "through" traffic, the provision of a switchboard would not have been worthwhile even though TER* procedure was also adopted."

14. Minimum Requirements for Wire Communications within Army Group

1. Communication between Army Group and Army

a. Two speech circuits were required from Army Group to Army Headquarters.

b. Two speech circuits were required from TAF (at Army Group) to TAC at Army (U.S.). One speech circuit was found necessary from TAF (at Army Group) to TAC at Army (Br.).

c. One lateral was required from TAC British to TAC U.S.

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* TER procedure is a system of re-transmission, whereby in a switched telegraph network, should the desired outlet be found busy, a local terminal station accepts the message for re-transmission. In such a system certain stations only are nominated as TER stations for specified outlets.

2. Within Armies the following minimum channels were found necessary

a. U.S.

(1) Army to Base Section.

Seven speech channels and four teletype channels. These were provided by using four open wire circuits from base section to Army and working two CF-1 carrier systems to provide the seven speech channels, using the eighth speech channel to provide the four teletype circuits by use of a CF-2 carrier system. The four physical circuits required were constructed and carried forward along Army Axis of signal communication by Army signal units.

(2) Army to Corps.

Four speech channels and one teletype circuit. These were provided by working a CF-1 carrier system on two physical circuits which were spiral four cable, open wire or a series combination of the two. The teletype circuit was provided by a simplex on one of the physical circuits.

(3) In addition to the channels mentioned, it was SOP for Army to provide two speech circuits and one teletype circuit to any Task Force or division directly under Army. These circuits were normally field wire or spiral four depending on the distance involved. The teletype circuit was provided by simplexing one of the physical circuits.

(4) Corps to Divisions.

(a) Two speech channels to each division.

(b) One teletype circuit to each division. Circuits were usually spiral four. It became SOP to use CF-1 carried between Corps and Division. This provided additional circuits if needed. In some cases one channel was used to provide a lateral between divisions.

(5) Corps to Corps troops.

(a) Two speech circuits were provided to Corps Artillery Headquarters and to the AAA Brigade. Other Corps troops were served with one line.

(6) Circuits within a division were:

(*a*) Division to Regiment—two speech circuits.

(*b*) Division to Divisional troops—one speech circuit.

(*c*) Regiment to Battalion—one speech circuit.

(7) The above data was a minimum standard, and, in many instances, particularly in static situations, with extended fronts, additional circuits were provided as required.

b. British.

(1) Army to Corps.

Three speech plus one teleprinter channel were found necessary. One speech channel was an alternate with a different but not necessarily a direct routing.

(2) Corps to Division.

Two speech channels plus one telegraph channel (Fullerphone) were necessary. One speech channel was an alternate with a different, but not necessarily a direct, routing.

(3) Division to Brigade.

Two speech channels, one being an alternate routing (via a lateral Brigade if convenient).

(4) Brigade to Battalion.

Two speech channels, one being an alternate routing via a lateral Battalion or Artillery Regiment.

(5) TAC to MORU (U.S. equivalent SOR).

Two speech circuits were found necessary.

15. Use of Telephone Carrier between Corps and Division

Carrier systems were installed between Corps and Division to improve security of speech circuits. No increase in security classification above CONFIDENTIAL was given these carrier

circuits. Most signal officers at Corps and below believed that the gain in security did not warrant the use of the carrier but felt that the improvement in the quality of the circuit made employment of carrier worth while.

Where a CF-1 system was employed the VF channel No. 1, was generally not used. When all remaining channels were not needed for direct circuits to Divisions, one was used to furnish a lateral between Divisions.

In the British Army it became SOP to employ "1+1" system (one voice frequency plus one carrier channel) between Corps and Division.

16. Shelters required for Switchboards and Terminal Equipment

Divisions utilized trailers to house switchboards and other terminal equipment, but in most cases preferred to install equipment in a tent or building where it could be dug in and protected.

At U.S. Corps and Army levels, where necessity for protection from artillery fire was slight, the use of 10-ton Vans proved highly satisfactory and efficient. A K-60 truck provided an excellent shelter for carrier equipment at Corps.

At Fifth Army, half of the equipment was installed in vans; the remainder was not mounted vehicularly but was moved by whatever transportation was available. This provided a flexible set-up giving a mobile, sheltered installation where required, and also additional equipment which could be housed in buildings. Buildings were preferred whenever available because they provided better operating conditions.

In all cases where vehicular installations were made, equipment was so installed that it was readily removable when it was necessary or desirable to make a ground installation.

British practice was generally the same as the above except for the difference in vehicles used.

The vehicles provided at British Corps Headquarters and above did not, however, prove to be sufficiently large to

accommodate the switchboards and all the necessary terminal equipment, and at the same time include a small fault control office. It was necessary to improvise special terminal equipment vehicles for the carrier equipment, leaving the official TEV (Terminal Equipment Vehicle) for housing the switchboard frames and fault control only.

The TEV (Division) was built to contain both the Division switchboard and the message center (signal office). This proved undesirable and certain divisions obtained surplus vehicles to house the switchboards and frames leaving more space in the TEV for the message center.

17. Types of Circuits for which 5 and 10 pair Cables were used (U.S. only)

Five and ten pair cable was used extensively for local distribution in CP areas. It was easily and rapidly installed and permitted a neater installation than field wire.

Five and ten pair cable was also used to bring wire lines from a wire head on a main road into a CP. In these instances, distances were less than a mile.

18. Utility of MAL compared with RPL for rapid line construction

Experience proved that RPL was not a satisfactory system of building open wire. Contrary to the implication of its name, Rapid Pole Line did not permit rapid construction. Warping of poles and arms caused continuous trouble after construction had been completed. Where a rapid pole line was required and British MAL (Multi Air Line) was available the latter was employed. MAL, a light pole line, constructed with lance poles and a maximum of two cross-arms carrying four circuits of light (70 lb) copper, proved a very satisfactory system. It was easily and rapidly constructed and gave excellent service.

19. Types of Wire used for Army and Corps Wire Axes

American experience has proven that the best construction between Army and Corps is open wire. Rapidly-moving situations at times made it necessary to follow Corps with spiral-four but this was replaced with open wire as quickly as possible. Between Corps and Divisions spiral-four was used entirely and proved rapid and efficient.

British practice was to use MAL between Army and Corps, and Spaced Field Cable (9 in. spacing between wires) between Corps and Division, when laid by the signals unit concerned.

British experience developed the following PL practices. When the Line of Communication pole line artery coincided with the Army Axis, L of C personnel were employed to build PL as far forward as possible in advance of Army to enable such PL circuits to be employed for Army to Corps communications. This avoided the duplication of work caused by the erection of MAL and its subsequent replacement on the same route by PL. Army arteries were built in advance of Corps in a similar manner, but by Army Signals, when the Army was not moving on an L of C Axis.

Corps not moving on the Army Axis, at times patched up existing PL routes on their axes, but this was avoided when the subsequent rehabilitation of the PL routes was to be carried out by L of C personnel.

MAL and Spaced Field Cable proved sufficiently rapid and suitable for their respective purposes.

20. Construction of Spiral Four Cable (Quad Cable) Routes

It was found that in order to obtain the most trouble free service, spiral four (quad cable) should be placed in the air. Existing poles or trees along the axis were used or lance poles

were set. Where the installation was to be semi-permanent, use was made of messenger wire. Metallic connector-covers between cable lengths of U.S. Spiral four should be removed and stubs should be weatherproofed with rubber and friction tape.

21. Use of several Carrier Systems on Open Wire Leads

The extent to which carrier systems can be applied to an open-wire route depends on the type of transposition system employed. Civil practice in Italy did not, in general, foresee the application of high frequency carrier systems. In practice it was found that there was substantially no limitation to the number of systems that could be applied, utilizing frequencies up to 10 to 12 kc/s. The type of transposition system which was found most adaptable to military needs was the TIMO system which employs "Diagonal Pairs" in groups which rotate through 90 degrees on a 6 bay-interval scheme. It was usual practice to have 30 kc carrier systems at the outer ends of cross-arms with two intermediate groups working either at voice frequency or up to 10 kc/s, in which case no distance limitation was experienced.

Two examples showing the extent to which several carrier systems have been operated on the same routes are given below:

    a.

       (1) Carrier system used between Florence and Traversa:

Pair 1	1	CT-1+1 (Active)
Pair 2	1	CT-1+4 MK II.
Pair 3 and 4	2	CF-1/CF-7
Pair 5	1	CT-1 + 1 (Active)
Pair 6	1	CF-1/CF-7
Pair 7 and 8	2	CT-1 + 4 MK II

Total 8

(2) Transposition: TIMO

(3) Pole diagram:
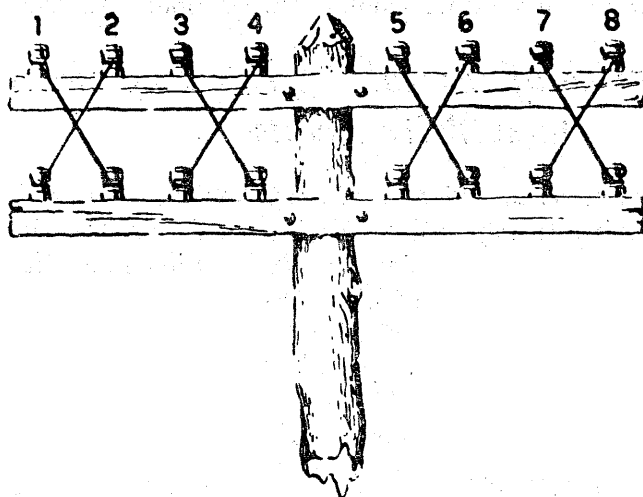
(4) Wire: 104 copper (British 200 lb)

(5) Distance: 30 miles.

(6) General: The CF-1, 1 + 4, and 1 + 1 systems were all operated as two-wire systems. Three CF-2 systems utilized a channel each of the CF-1's and three simplex teletype circuits were also established. A total of 15 teletype and 28 speech channels were established.

b.

(1) Carrier systems used between Florence and Leghorn:

Pairs 1 & 2	2	CF-1/CF-7
Pairs 3 & 4	1	CF-1
Pairs 5 & 6		Fault control and physical
Pairs 7 & 8	2	CT 1 + 4 MK II
Pair 9	1	CF-1/CF-7
Pair 10	1	CT + 1

Total 7

(2) Transposition: TIMO

(3) Pole Diagram:
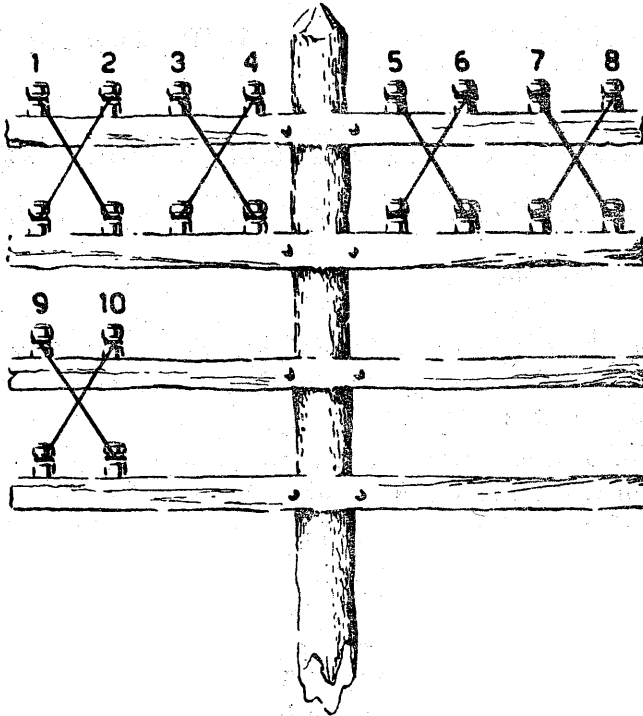
(4) Wire: 104 Copper.

(5) Distance: 70 miles (not repeatered)

(6) General: Two CF-2's and one half 40 C-1 VF teletype systems were also employed. A total of 28 speech and 18 teletype systems were established.

Note: CF-1	—	One VF speech + 3 carriers speech channels.
CF-7	—	Hybrid coil permitting operation of CF-1 as two wire system.
CT-1 + 1	—	One VF speech plus one carrier speech channel.

CT-1 + 4 — One VF speech plus four carrier speech channels (high frequency).

CF-2 - 4 — Channel VF teletype system.

Half 40C-1 — 6 Channel VF teletype system.

22. Use of Foreign Transposition Scheme in Rehabilitation of Open Wire Routes

From theoretical considerations, when patching or extending a foreign route, the foreign transposition must be carried on unless:

a. The existing route terminates at, or is cut back to the end of a complete transposition section.

b. A complete re-wiring of the existing route is necessary.

In the Italian theater, experience showed that demolitions, and the effects of our own and enemy fire, required the complete re-wiring of most routes. When re-wiring routes over which U.S. or British Army carrier systems were to be employed, it was found advantageous to utilize the Italian TIMO system. This foreign transposition system generally required less materiel than the flat pair types, and local resources could be utilized to the fullest extent. When linemen became accustomed to it, it was found quicker to build than the standard Army types. A main consideration was the employment of a common theater system.

For the above-mentioned reasons a foreign transposition system was adopted almost entirely on rehabilitated routes, except where the operation of a high frequency carrier system was planned for each pair, in which case the "C" type (U.S.) transposition was employed.

23. Radio Requirements which were not met by Existing Equipment

In general, U.S. radio sets met the requirements for which they were designed; however, a few deficiences appeared.

The SCR-536 did not give the desired results for infantry platoon and company communication. It was subject to loss because of the method of carrying it; sound from the speaker gave away positions to the enemy; and the frequency range in which it operated made operation at night difficult. A modified version, which allowed it to be slung on the operator's side and which utilized headphones and separate microphone, was an improvement, but was awkward to operate because of the position of the transmit-receive switch.

It was found that rod antennas on sets used in forward positions could be seen by the enemy and drew small arms fire. Various improvised antennas were used in attempts to overcome this hazard.

Difficulty was experienced in the mountains by the infantry and artillery with the heavy SCR-284 and the SCR-610.

British Army radio sets, in general, met the requirements for which they were designed, except in the case of the Infantry sets.

The disadvantages met with British Infantry sets were as follows, and it was felt that these could be eradicated in future set design.

WS 18 or its American manufactured counterpart WS 48, used for Infantry Battalion to Company communication, was satisfactory except that it operated in the 6-9 MC/s frequency band, the range thus being considerably reduced at night due to noise pick up. It was not provided with crystal control and was liable to get off frequency during operation, if in the hands of poorly trained personnel.

The same disadvantages applied to WS 38 which was used forward of Company Headquarters. WS 38 had the additional disadvantage that it was not provided with a hand set for use

by an officer or commander wishing to speak on the set. The difficulty of rendering the wearer inconspicuous was overcome by a locally improvised method of wearing the set in a hip haversack, and by the use of ground antennas.

The fact that two separate sets were required for use within the Infantry Battalion was also a disadvantage, and it was recommended that *one set* should be designed to cover the following requirements:

Infantry Battalion to Company link.
Infantry Company to Platoon link.
Infantry mortar-base-plate to OP link.
Infantry Tank Co-operation set.

In order to obtain satisfactory and interference-free day and night working, it was felt that the frequency range of the set should be in the order of 40 MC/s. and that the range should be from 3 to 4 miles under all conditions. The weight of the platoon to company set must not exceed 20 pounds. The set should be crystal-controlled and should have sufficient channels for the number of nets required in a Division.

No standard radio-teleprinter set was available in the British Army and although other sets were modified (SCR 399) to operate for this purpose, it was felt that the future range of British sets should include this facility. This facility may well be combined with a multi-channel voice set, but probably due to the security restrictions which were imposed on voice radio circuits the need for such multi-channel sets was not strongly expressed. Higher formations did feel, however, that the reduction of the number of separate sets at a headquarters by combining these into single multi-channel terminals, would be an advantage, even if the introduction of the multi-channel sets did entail the use of very high frequencies and hence relay stations to overcome the optical-range difficulties.

24. *Radio Sets for Air OP Communication*

The standard SCR-510 and SCR-610 proved entirely satisfactory in air OP communication in U.S. Forces. An alternate means of communication between OP planes and the

ground was provided with the SCR-300. The set was easily installed behind the rear seat of either the cub plane or the L-5, and provided satisfactory communication up to ten miles. By the use of the RC-63 (half rhombic antenna) at the ground station, communication at a distance of twenty-five miles to a plane at 3000 feet was successful. This means of communication may be used in emergencies between infantry or reconnaissance elements and air observers.

In British practice the standard set eventually employed was the No. 22 set (AM). This was on the whole quite satisfactory. Disadvantages were that the set worked in the 2 to 8 mc band and was therefore subject to considerable interference from other nets. A higher frequency set was advocated. The No. 22 set was too heavy, weighing 54 pounds less batteries, and was difficult to net while in the air, as this required the use of both hands.

25.   Tank-Infantry Communication

The problem of tank infantry communication was not solved satisfactorily. Some progress and improvements were made. The problem was not confined entirely to communication between tank and infantry but in U.S. practice it was related to problems of communication within the tank units themselves. Lack of combined infantry-tank training accentuated the problem.

One of the best links between tanks and infantry was the AN/VRC 3 (tank version of the SCR-300). This set in the tank operated in the infantry net and was satisfactory to the infantry because it required no additional equipment. The tanker on the other hand was burdened with another radio to operate. This difficulty was overcome in some cases by putting an infantryman in the tank to operate the AN/VRC-3.

Another method of providing communication was for the tank unit to supply a liaison officer with an SCR-510 radio. The size of the SCR-510 made it difficult to transport, and it was therefore not completely satisfactory.

A combination of the two above-mentioned methods; i.e. SCR-300 link and liaison officers, was also used, giving two channels instead of one. This was the most satisfactory method used.

The use of a telephone mounted on the outside of the tank and connected to the tank interphone system was not particularly well thought of by either tank or infantry personnel. The tanker disliked it because damage to the installation might render the interphone useless; the infantryman disliked it because he had to expose himself to get to the phone. There were however, instances where it was an advantage. In British units it was considered a necessity and steps were taken to overcome the technical difficulties encountered.

A suggestion made by both infantry and tank personnel was that the infantry be provided with a radio of the size of the SCR-300 which could be operated with the SCR-500 series FM sets. This would not replace the SCR-300 but would be an auxiliary set to be used only when tanks and infantry were operating together. The set would also fill the requirement for a set which could communicate with individual tanks.

British experience also showed that a great deal of the difficulty was brought about by lack of combined infantry-tank training, but more by lack of training in the use of platoon and company sets by the infantry themselves.

The British 38 set, (comparable to the SCR-536) was worked to a similar set mounted inside its tank, but so arranged that the tank commander could use it with the same microphone and headphones he used on his main set. Its short range of roughly 2000 yards limited its usefulness. It did, however, provide a communication link between infantry and the individual tank, a definite advantage which could not be had with U.S. equipment, and was used as the main means of communication when a tank troop was working directly with an infantry company or platoon.

When a tank squadron (U.S. company) was in support

of an infantry battalion a liaison officer was sent to the infantry battalion. This did not provide sufficient flexibility and it became necessary to mount a second set in the squadron commander's tank which operated on the infantry battalion command net, thus providing another link from tank commander to infantry commander and also permitting direct communication between tank commander and infantry company if necessary. This proved to be the most satisfactory system and was used extensively.

When a tank squadron (U.S. company) was operating in support of an infantry Battalion, it was usual for the squadron LnO to be at company CP, remaining with the company commander at all times. For this reason he was provided with a WS 18 or 48 (equivalent to SCR-300) with which he maintained direct communication with the tank squadron commander who had a similar set in his tank.

This latter method was very successful and led to the belief that it was best to employ LnOs from tank units down to infantry company CPs as a standard operating procedure, but unfortunately tank squadrons had insufficient officers to allow this to be put into effect.

26. SCR-536 to direct a Tank Dozer (U.S. only)

Excellent results were obtained by the use of a SCR-536 link between a Tank Dozer and an observer on the ground. The tank was able to operate buttoned up when under observation and the observer outside could direct its operation from a defiladed position.

27. Operation of Radio Link Between Division and Regiment (U.S. only)

It was common practice for divisions to send SCR-193 radios with operators to each infantry regiment to supply the radio link between division and regiment. This radio team

acted also as a small message center, doing its own crypto-graphing, and delivering its own messages. Although the infantry regiment had an SCR-284 (later replaced by SCR-694) it never gave reliable communication. Division signal officers believed it preferable to supply to the regiments a radio and the personnel to operate it from the Division Signal Company, rather than to alter the regimental T/O to provide an SCR-193 for each regiment. Regimental radio personnel and the SCR-284 so released were made available for other communication purposes within the regiment.

28. Location of Radio Transmitters at Division, Corps and Army

In U.S. units it became SOP for units above Division to locate their radio transmitter outside of the CP area. Placing the transmitter, and in most cases the receivers, outside the CP was done primarily to facilitate control and to keep away from possible sources of man-made interference. Locations at the different levels were generally as follows:

a. Division: The location of radio receiver and transmitters at Division was in most cases in close proximity to the CP, usually about 500 yards. Remote control was not used and messages were delivered from the Message Center to the particular radio which was to transmit it by foot messenger.

b. Corps: The most practical location of transmitters at Corps level was in the bivouac area of the Operations Company of the Signal Battalion. Transmitters were remotely controlled from a point in the CP. A teletype circuit was installed from Message Center to the transmitter area for use when, in emergencies, it was necessary to place control at the transmitters.

c. Army: At Army, transmitters were placed at least a mile from the CP. Because of the greater distances worked, it was necessary that the best transmitter location available

be chosen. Remote control was used, and receivers were located near the Message Center.

British practice was as follows:—

a. Division: All transmitters, were operated from their respective vehicles, and were located, suitably dispersed, in the Division CP area. The high power R/T sets were kept well away from all other stations and remotely controlled from respective CVs (command vehicles). W/T sets were placed as near as possible to the message center consistent with suitable transmitter location.

b. Corps: W/T transmitters were located within or just outside the Corps CP area, depending on the availability of a suitable radio site. This site was not normally more than ½ mile from CP. The receivers of these sets were mounted in a central receiving vehicle located near message center from which the transmitters were remote-controlled. The R/T transmitter and receiver of the main forward control link to Division was located close to the G-3 operations office with a direct remote control in that office. The Corp Artillery commanders R/T forward control was similarly located, complete, near the Corps Artillery Section Office.

c. Army: Two transmitter sites, each containing approximately half of the available transmitters were located at distances up to 1 mile from the CP. Each site was connected to the central receiving room by means of a multi-pair cable running by a different route. The sites chosen were the most favorable from the radio point of view. One site was a standby for the other in the case of an emergency. Further sites were required for:—

(1) Radio Teleprinter links, which had to be kept well clear of any source of man-made interference, and whose aerials had to be high in view of the "optical-path" tendency of the frequencies in use.

(2) The Army R/T forward control set. This set was normally located near the G-3 operations office with a direct remote-control to the staff.

(3) No. 10 Sets (UHF multi-channel sets) if provided.

d. It was found desirable to locate the W/T trans-mitters of the Air Support Signal Unit at the main Army transmitter parks to avoid the interference which they caused in the central Army receiving room in the CP area.

29. *Enemy Fire on Radio Transmitter Sites*

The impression given by manuals, and through instruc-tion, that radio transmitters attract artillery fire caused communication personnel to silence radios to an unwarranted extent, thus wasting valuable communication facilities.

Experience disproved the idea that the enemy used radio direction finding equipment to bring fire on radio stations. To quote one Infantry division, ''Many instances were brought up indicating enemy shelling due to direction finding equipment used on our radio transmitters. In every case investigated it was found that the cause was not DF. Common causes were:

a. Visual sight of the operator, antenna or troop concentrations.

b. Location of the transmitter near a worthwhile target such as a gun position or prominent crossroad.

c. Transmission in the clear of friendly locations or movements.''

30. *Practicability of Link Sign procedure (U.S. only)*

''Link Sign'' radio procedure was used by U.S. units throughout all operations in the Italian theater. Coupled with the ''Army Code Sign System'' for assigning radio call signs, it proved more efficient and more secure than the double call sign procedure taught in the United States.

31. Requirements and Provision of Air Messenger Service at Army Headquarters and Below

Division made little use of cub planes for delivering messages. In emergencies cubs obtained from artillery units were used. This proved satisfactory as the number of times planes were required was small, and no hardship was felt by the artillery.

Although it was not a standard practice, Corps made frequent use of cubs to reach divisions whose CPs were at a distance and when roads and traffic made motor messenger too slow. Some difficulty was experienced in finding suitable landing fields near Division Headquarters. Cubs were also used laterally between Corps. It proved quite practical at U.S. corps to utilize cubs from the attached liaison group (Air Force) to provide regular messenger service. Planes were allotted when necessary to British Corps from either Army Intercommunication Flight (RAF) or from Corps Artillery.

Both U.S. and British Armies made extensive use of air messenger service by cubs to Corps, separate forces, and base sections. Army demands for air service were great enough to warrant the recommended attachment of an air-messenger unit to the army signal services. Such units should be sufficient in size to provide two runs a day to all subordinate major units plus, in case of the British Army, a pool for allocation to Corps. Contrary to U.S. opinion the British feel that air-messenger service at Army should be entirely a Signal function to insure handling of messages throughout by signal personnel.

32. Handling of Priority Messages by MDLS

Within an army, the handling of priority envelope traffic required definite control. Special messengers were available to staffs at all times and were used as required. However, by publishing schedules of regular messenger runs, which were made up to meet requirements of sections originating daily

reports, the call for special messengers was greatly reduced. The schedule of regular messenger runs was given wide distribution to the staff sections, with the request that envelope traffic be timed to meet scheduled runs. When a staff section knew it would have urgent traffic ready shortly after a scheduled run, it contacted the message center officer and informed him of this fact. It was left to the discretion of the message center officer whether to hold the scheduled run a short time or send a special messenger. This often saved duplicate runs within a short space of time.

In rear areas, however, where traffic often passed through several intermediate offices, and could be transmitted by several different means, (air, motor, etc.) a system of priorities was considered desirable to ensure that urgent mail received proper treatment at all stages of its journey. The use of colored bags or colored bag tags, was suggested as a method of differentiation between the priorities of various bundles of traffic.

33. Reproduction and Distribution of Messages (U.S. only)

Message centers were not used to reproduce messages.

At Army all incoming traffic was routed directly from message center to the mail and distribution section of the AGD which was located nearby. This section of the AGD made copies and distribution required and indicated the action addressee dependent upon the nature of the message.

On outgoing messages staff sections were required to furnish and deliver two copies to message center, and one each to AG, Records, C/S and each interested Staff section.

At Corps and Division, operational messages were delivered by Message Center to sections concerned, which then were responsible for making necessary copies for other interested sections, and for transmittal of messages to AG for file. Non-operational messages were delivered directly to the AG representative of the echelon concerned unless addressed to a specific

section. Originating sections were required to deliver to message center one copy of an outgoing message for each addressee and one for message center file. If internal distribution to other staff sections was desired as well, the originating section prepared copies and made that distribution.

At Army Group Headquarters reproduction and distribution of incoming messages was accomplished by an SMC (Staff Message Control) under operational control of the Adjutant General. One of the local recipients was designated as ACTION as indicated by the contents of the message. Local distribution of copies of outgoing messages was the responsibility of the originating section. The message center passed a copy of each outgoing message to the SMC for filing and as a reference for dealing with replies.

34. Security Classification of Teletype Circuits

The practice of permitting transmission of CONFIDENTIAL material in the clear by teletype was followed throughout all operations. This increased speed of transmission and greatly relieved cipher personnel. It was generally agreed by Signal Officers that teletype circuits within an Army area were secure from interception and in no case was an instance of wire tapping suspected or found. It was felt by U.S. personnel that the greatest drawback to transmission of SECRET material in the clear was the loss of security caused by the additional friendly personnel who would, of necessity, have access to such materiel. However, both British and U.S. personnel agreed that the volume of SECRET traffic was never so great that cipher personnel could not cope with it adequately.

35. Practicability of including a Radio Teletype Link in a Land Line System (U.S. only)

From a security viewpoint it was felt that it was practicable to connect a radio teletype link into a teletype switchboard and

thus give land line subscribers direct access to the radio link. This was done in one instance and proved satisfactory. Necessity for constant supervision to see that no clear text passed over the air was stressed, and this hazard was considered the only drawback to the use of such a circuit.

36. High Grade Crypto Systems for Units of less than Division strength

Task forces of less than a division in strength and of special organization were occasionally attached to Army or Corps. Where the employment of these forces was such that there was little danger of the CP being captured, a crypto team with sigaba could profitably have been used. This would have provided essential security otherwise impossible, and traffic could have been cleared much more rapidly. Teams should be made up of three men with one sigaba. They should be provided from an Army signal unit, and attached as directed by the Army Signal Officer.

When it was necessary to equip units (less than division strength) with high grade cipher the OTP (one time pad) and the M209 were used.

37. Traffic Control Communication

A signal operations company was utilized to provide necessary communication for Army (U.S.) traffic control and Transportation Hqs. which demanded a fairly extensive communication network.

Within Corps and Divisions a much more limited system was required. In the case of both Division and Corps, adequate signal personnel were available to provide required communication from TCPs to the nearest switchboard and to construct other point-to-point circuits. In some cases telephones for their posts and enough wire laying equipment to set up their own communication on one way stretches were furnished to the MP's by the signal unit concerned.

On occasions when it was impossible to establish wire communication within the time limit the situation demanded, SCR-193s in carryalls and with operating personnel were used until such time as the traffic post could be tied in by wire. Radio teams were provided with a special digraph code for purely traffic control messages and with M-209 for longer and more detailed messages.

Similar problems were met in the British Army and were overcome in much the same way. TCP's for movement control were linked to the main wire network where possible by the responsible headquarters signal personnel. It was not possible to allot special wire personnel. TCP's at all levels were provided with radio sets WS 22 (equivalent to SCR-193). Insufficient Royal Signals personnel were available in organic signal units to man the radio rets. Regimental communication personnel were obtained from disbanded AA units for this purpose. As security is vital on movement control nets, it was strongly advocated that additional Royal Signals personnel should be provided for this purpose and that a special code should be introduced. Slidex, which was used by the British, was not considered sufficiently secure and was too slow to operate.

38. Electric Power requirements for Signal Installations (U.S. only)

Headquarters power sources (Engineer) were not satisfactory as a source of electricity to light message centers and to operate code machines at Army, Corps, or divisions. Where extra Signal Corps power units were not available, the generators, which supplied communication installations (switchboard, teletype, etc.), were used to supply message center as well. These generators were not of large capacity and extra demands overloaded them. Where possible, provision was made so that signal installations had 24-hour service from a central source which was large enough to provide for all requirements. This eliminated the use of several small power units within a small area and simplified maintenance problems.

39. Provision of Communication Specialist Replacements within a Field Army (U.S. only)

During certain periods specialist replacements became a problem, particularly in lower echelons. Wire personnel in particular were not available in sufficient numbers to replace casualties. In order to alleviate this situation several systems of unit training and allocation were set up by the divisions.

a. Personnel who had some experience or seemed qualified were taken from the division replacement pool, attached to the Signal Company, and there received training prior to their assignment to an infantry unit. These men were given basic instruction and they were further trained by giving them training on the job in division rear areas.

b. In some cases the selected replacements were kept in the division replacement pool where they received training and instruction in their particular specialty.

c. Another system used was to assign replacements immediately to the individual unit for training prior to their entry into combat, thus giving them the advantage of training with the organization with which they would later serve. During combat these men were either returned to the replacement pool or attached to the Signal Company where their training was continued until they were needed.

40. Signal Information and Monitoring Services (U.S. only)

1. SIAM (Signal Information and Monitoring Service) was developed from the British "J" and "phantom" services, combining the monitoring of the "J" services and the system of phantom liaison officers with radio transmitters.

2. The SIAM service performed two functions:

a. It provided the army commanders and the com-

manders of Corps and Divisions with prompt, tactical information from front line units—information which, when sent through normal channels, took considerably longer to reach the aforementioned headquarters.

b. It provided a check upon the radio and crypto- graphic security of radio nets within the Army.

3. A provisional company was organized by NATOUSA and was used during the march on Rome. SIAM functioned well and provided valuable information. This SIAM company, reorganized under War Department T/O & E, was attached to the Seventh Army prior to the invasion of France. NATOUSA then ordered activation of a new company.

4. The operation of the SIAM service was the respon- sibility of the Army signal officer, through the signal intelligence (SIS) officer.

a. Operating personnel and equipment for the service were provided by the SIAM company. The operating platoons of this company were known as SIAM platoons, and were designated as the Army platoon, Corps platoon, Division platoon and Armored Division platoon, according to their level of operation. This company was designed to cover any size Army, the number of platoons being dependent upon the size of the Army. The platoon was not attached to a Division for anything but rations so that an unbiased policing job could be performed and the work of all platoons on the Army front could be coordinated by Army headquarters.

b. SIAM platoons were assigned with the purpose of covering the radio nets of the entire Army Front. Normally a SIAM platoon was located with Army Headquarters, each Corps headquarters and in the sector of each Division. These platoons were under the direct control of Army for both technical and tactical direction.

c. The Army and the Division platoons had assigned to them a tactically trained officer whose duty was to maintain active liaison with the Army and Division staff sections.

5. The monitoring procedure was standard for all platoons.

a. SIAM platoons maintained a continuous monitoring

coverage of the active radio nets in the Army to provide a check upon the security of radio procedure and of message traffic of these nets. The Army platoon monitored Army nets, Corps platoon monitored Corps nets and Division platoon monitored Division nets. The platoon commander determined the nets to be monitored after coordination with the signal officer of the unit for which it was responsible. In order to ensure efficient monitoring, the important active nets (command, liaison, reconnaissance, artillery, and air support) were monitored continuously. Other nets were monitored as often as possible.

b. Monitoring was on a 24-hour a day basis, except in cases in which the net being monitored was closed during the night. Each monitoring operator kept a monitoring log of all transmissions, except that all message texts were copied on separate message blanks and were sent to the platoon message center immediately. The headings of all messages, however, were included on the monitoring logs. Monitoring logs were sent to the platoon message center at the end of each day.

c. At the platoon message center all cryptographed messages were decryptographed, and all messages, both cryptographed and clear text, were studied by the platoon commander to determine if they contained any violation of security. Monitoring logs were checked for violation of operating procedure.

d. When a violation of security was found by the platoon commander an immediate report, containing the transmission, time, call sign identifications, violation, and a statement showing why the transmission was a violation of security, was made. The original copy was forwarded to the Army signal officer, attn: SIS, and copies were sent to the G-2 and signal officer of the Corps or Division concerned. This report was for the information of the Corps or Division involved and did not constitute a "command letter". All clear text violations which might have been of immediate consequence to our own troops were brought to the attention of the G-2 without delay. Violations of radio

procedure were brought to the attention of the signal officer by a written report. These reports by platoon commanders were not intended to eliminate the need for "command letters" from Army headquarters, but were for the immediate information of the personnel to whom they were distributed for such action as they might consider necessary.

e. Monitoring logs, with the cipher texts of the messages, were forwarded daily to the Army signal officer (attn: SIS), for further study and evaluation. A mission assignment, operation report, and copies of violations reports accompanied each set of logs.

f. Net frequencies were checked periodically and, in all cases where such checks indicated a net was operating off frequency, an immediate report was made to the signal officer concerned.

g. SIS supplied each platoon with a file of security publications. In addition, the platoon commander obtained copies of local radio instructions from the signal officer of the unit being monitored.

h. In view of the fact that the platoon commander could not stay with the platoon at all times it was necessary to have at least one qualified NCO on duty during his absence to act as security chief.

6. The processing of information was standardized for all platoons and liaison officers.

a. The SIAM service established and maintained SIAM radio nets operating from Division platoons to the Army platoons, with the Corps platoons as "listening" stations, for the purpose of relaying front line information directly to corps and Army headquarters. The number of SIAM nets operated depended upon the tactical situation. Information of one Corps and its Divisions was sent down the SIAM net which included the other corps in the form of actual important intercepts, and in the form of sitreps prepared by the SIAM liaison officer at Army headquarters using both SIAM information and information from the Army G-3 section.

b. The information relayed on the SIAM net was obtained by two methods.

(1) Intercepted messages: All messages intercepted by Division platoon were evaluated by the platoon commander, and messages which had tactical value were relayed to Army and Corps without delay. All, except insecure messages, were relayed in their original form. Insecure messages were re-enciphered in the M-209 or One Time Pad system before transmittal on the SIAM net. New message headings were made up and the principles of paraphrasing were observed. The plain text of all messages was given to the Division, Corps and Army staff sections.

(2) Liaison officer reports: In order to supplement the information obtained by intercept, SIAM liaison officers submitted to Army SIAM short periodic reports on front line locations, type and amount of enemy resistance, etc. This information was obtained from the division staff sections.

c. The information collected by SIAM, whether by intercept or liaison, always indicated the source of the information (e.g.: intercepted from ....: G-2 reports, G-3 reports or liaison reports). No messages contained any opinions of SIAM officers. Specific items of information requested by staff sections were obtained whenever practicable.

7. SIAM information was not intended to bypass or replace official channels, but, rather, was designed to provide, in the minimum time, a picture of the frontline tactical situation, and also to verify information received from other sources, such as photo reconnaissance, tactical reconnaissance, etc. It was not intended to be used as the basis of official reports, nor was it intended to be acted upon. It was intended to be a preview of reports which would come back through the slower, normal channels.

41. Additional Communication Requirements of an Armored Division (U.S. Army)

Extended experience in combat in the Mediterranean Theater showed that the Armored Division habitually required an extensive telephone communication system, necessitating additional wire equipment. It was nearly always possible to establish and maintain wire communication from Division to the combat commands and within the commands themselves, even in the fastest moving situations encountered. In slower situations and under static conditions extensive wire nets were built up.

The SCR-510 was too heavy for the armored infantry to carry and therefore did not provide as satisfactory communication as might have been realized from a lighter, more portable set of the size and weight of the SCR-300, but with the frequency range of the SCR-510.

Chapter Seven

ENGINEER

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1. Topographical Intelligence

Although the Army G-2 was the collecting and disseminating agency for topographic information, the Army General Staff relied on the Army Engineer to evaluate all topographic intelligence required for its planning. This worked very satisfactorily. By the nature of his work and training the engineer was best equipped to advise the staff on terrain and communication routes.

Corps and Division Staffs in general asked less advice from their engineers on terrain than did the Army, because adequate engineer photo interpretation organizations did not exist in Corps and Divisions.

2. Early Provision of Topographic Intelligence

The early provision of such general topographic studies as Inter-Service Topographical Department reports, was very helpful to the Army staff for orientation purposes. Since the Army planners seldom studied terrain in detail further beyond the front than 100 miles, and since the advance through Italy was relatively difficult and slow, the engineer intelligence organization was able to satisfy the demands of the planning staff, and subsequently the staffs of lower echelons.

Experience showed that if lower units were provided with information of areas too far to their front, they were inclined to "file and forget" or misplace the information. For this reason, the timing of the distribution of engineer intelligence to lower units was given considerable attention, and close liaison between engineer intelligence officers of all echelons was necessary.

3. Organization of Army Engineer S-2 Sub Section

It was found necessary to augment the S-2 sub-section of the Army Engineer Section by assigning to it an assistant S-2 and a photo intelligence team of two officer interpreters.

The S-2 spent at least half his time on intelligence, supervising the work of the assistants, and in preparing special studies for, and conferring with, members of the Army General Staff. The rest of his time was filled with supervision of mapping.

The assistant S-2 maintained the files on all data concerning terrain, communications, resources, and general intelligence information in enemy territory. He examined and evaluated captured enemy engineer materiel and techniques, disseminating information concerning them. Extensive use of mines and demolitions made this work of considerable importance. He prepared, in conjunction with the S-2, the detailed studies required by the General Staff.

Interpretation of air photos was the principal source of engineer intelligence. · In order to even approach the maximum efficiency in securing engineer intelligence from air photos, it was necessary that the photo interpreters be engineers with wide field (and preferably combat) experience. They could be easily trained in specialized photo interpretation because they had had sufficient basic training in this work.

One interpreter operated at Army Group headquarters. He had access to intelligence records from all sources including air photos. He made long-range interpretations across the entire front, reporting on existing routes of communications, possible likely sites for enemy demolitions, bomb damage, etc. He determined and recommended possible requirements for engineer works and materiel far in advance.

The other interpreter, at Army headquarters, made more detailed and extensive studies of the immediate front, and provided all engineer intelligence required by G-3. Working

through direct channels with all units concerned, it was possible for him to gather, evaluate, and disseminate intelligence efficiently.

4. Roads

1. Traffic Problems

a. Operational necessity and the existing roadnets required keeping the main axes constantly in operation and maintained at the highest possible standard. They could never be closed to traffic. This resulted in a large amount of uneconomical work; however, there was no alternative. Patching or half-width repairs had to be untilized where, under other conditions, full width repairs would have been more economical in time and labor. Engineer resources had to be committed for longer periods than would have been required if traffic could have been stopped. It was rarely possible to allow sufficient time for a newly laid surface to cure properly, with a resultant reduction in its period of life. These factors made long term forecasting of plant, labor, etc. increasingly difficult

b. The "1½-way" road proved to be inefficient when subjected to anything but the lightest traffic. Some vehicles invariably ditched themselves when passing others coming in the opposite direction, imposing serious delays on following convoys. In addition, engineer effort was wasted in repairing damage so caused. The best method of overcoming this was to make the road one way with parking lots at selected points along its length. These were then linked by telephone or radio, and traffic controlled by a system analagous to the block signalling system used on railways.

c. Where roads were in a bad state, engineer control had to be rigidly enforced through the medium of informing Traffic Control of the maximum densities of traffic and the classes which could be accepted.

d. It was found that a small amount of attention

paid to the "psychological" aspect of road construction was of great value in maintaining a flow of traffic at high density. Such items as level approaches to bridges and culverts, and footwalks on bridges to give them a wide appearance materially assisted in keeping up the speed of traffic. Firm road shoulders, and strong side walls or rails to mountain roads encouraged drivers to keep to their side of the road and not crowd the center. Similarly, drivers were discouraged from driving recklessly by altering the physical appearance of the road where necessary.

2. Construction

Road construction presented distinctly different problems in summer and in winter.

a. In summer, usually only the main supply routes were constructed, or repaired, to more than a minimum standard. Main supply routes required proper drainage facilities and a metalled surface. Laterals and secondary routes were maintained to provide a smooth roadway, but little or no attention was given to surfacing or drainage. The advance was so rapid during summer months that Engineers did not have time to do more than open secondary roads, and the short periods they were used made extensive work unnecessary.

b. During the winter months, every road that was used had to be put in the best possible condition, and drainage systems opened, enlarged, or rebuilt, if inadequate. New construction, or existing roads without good foundations, had to be corduroyed or given a good base of heavy stone. Culverts were a very important part of winter roads. Box culverts in rapidly flowing streams required flooring to prevent scour under the sills. Lining the inside of a box culvert with corrugated iron greatly increased the flow and prevented eddying about the posts. Small box culverts of wood for passing road drainage under road junctions proved very unsatisfactory because they became easily clogged with ditch mud due to their slow flow. As larger culverts were often

impractical, a steel pipe culvert of 12″ diameter was needed. Culvert beds were rapidly prepared by use of explosives. Curved sheets of corrugated iron made excellent forms for construction of masonry culverts. The biggest mistake in culvert construction was that they were very often built too small. It was found essential that a new culvert have as large a capacity as the original structure.

c. When small gaps were encountered in rapid advances, full advantage was not taken of the T-2 bridge layer to cross them. Often gaps were filled by advance units using tank dozers, when the T-2 could have been used. Tactical demands often precluded the placing of culverts, and many such fills had to be removed by following engineer units at the cost of a great deal of time and labor. Many small gaps were filled that could have been bypassed.

3. Maintenance

a. Maintenance in summer consisted mostly of smoothing with graders and drags, and filling pot holes. Dust was the greatest traffic hazard on dry roads. One method used to overcome this was by sprinkling with water, but due to limited equipment, only the most important areas could be wet down. Best results in sprinkling roads to overcome the dust hazard were obtained by sprinkling them at night as evaporation was much less at that time. Calcium chloride was used as a dust preventative with questionable results. Road oil was essential for dusty roads under observation.

b. Maintenance during winter months required the supreme effort and maximum employment of all engineers, especially since during winter months the front line was more or less static, and all roads had to be kept open for long continuous use. The main problem, as usual, was getting the water off and the rock on. All snow had to be removed from an earth road before rock was deposited and spread.

c. One of the worst problems during wet weather was mud carried on to the main roads from bivouacs. To combat this, units were required to construct entrance roads and

were allowed to draw rock from quarries and were furnished with culvert materiels if needed. At one time, Army was furnished 4000 tons of rock a day for this purpose.

d. Side roads had to be conspicuously marked and barricaded when they had not been opened. Barricades of trees and rocks were necessary to block off demolished bridges. Tracing tape could not always be seen, and was easily lost.

e. When sloping the sides of a cut was not practical and sloughing was likely to occur, the drains were kept open by laying along the ditches oil drums whose ends had been removed. Where possible, bleeder ditches were cut on a slope not less than 1 in 5, at least 18" wide, and at frequent intervals.

f. Rebuilding road shoulders with hand laid rock aided in preventing vehicles from breaking down the earth shoulders and clogging the ditches. At the same time, the road crown had to be maintained so surface water would run off.

g. Civilian labour was used to good advantage. It was found that, though a slow workman, the average Italian laborer was a good rock worker. In some cases, a civilian road foreman with civilian crew was given the responsibility of maintaining a definite piece of road.

h. Asphalt Roads.

(1) Washing stone for pre-mix asphalt.

When using river bed gravel for pre-mix, a road construction group found that the normal washing plant was not capable of handling the quantity of stone required. They then discovered that the stone could be washed perfectly in the river bed itself by using a bulldozer. With the dozer back-blading, the stone was pulled across a fast current in the river. In this way one D-7 could wash 100 yards per day.

(2) Bitumen.

The extremely large amount of oil patching necessary to keep roads in repair required bulk heating of bitumen. This was done by taking petrol storage tanks from filling stations and using them to heat the bitumen. They were erected with diesel-fed fires beneath them and earthed up to half-height for insulation purposes. It was found necessary to

insert an expendable baffle plate between the fire and the bottom of the tank to prevent the latter from being burnt out. Flues and chimney were constructed to produce the best possible draught. In this way one company heated 6,000 gallons at one time. Medium-curing bitumen took much too long to cure for operational purposes, since roads had to be used immediately after a surface was laid. In addition, water got into it while it lay in dumps and caused it to froth over and catch fire when in the heater.

Throughout the winter it was necessary to lay pre-mix on the roads either when it was freezing or when the roads were wet. At the same time these roads had to remain in uninterrupted use. To prevent the surface from breaking up under an immediate flow of traffic it was found necessary to increase the normal proportion of bitumen to stone in the mix.

4. Marking Roads

a. All principal roads in Italy north of the Volturno River were numbered, and the widest possible distribution of ''Road Numbering Maps'' was made. The numbering system was used in conjunction with the British method of giving code names to entire routes, and proved very satisfactory. This aided planning, and simplified road reports, assignment of work, and transportation problems.

b. Standard type signs, in general similar to those used in the United States, were found to be necessary. Prior to the adoption of standard signs, traffic was hampered by the wide variety of Italian and Allied road signs. It was found necessary to keep unauthorized signs removed from important roads junctions to prevent ''jamming''.

c. Luminous buttons made fine markers when placed high enough so as not to be splashed with mud, but they were stolen almost as rapidly as they were put up.

d. The Electric Flasher Lamp was often used to mark bypasses or bridges; however, the light given off was too small and in most cases could be seen only from a short distance.

5. Mule Trails

To overcome bogs in mule trails, a track was developed which was simple to lay, and which could be carried on mules. It was produced by cutting Sommerfeld track and Coir matting to half width. The cut end of every fourth or fifth reinforcing bar was bent to form a loop to be held· by picket. Three-foot pickets with a hook at one end were made from ½-inch mild-steel bar. Prior to laying the track, the trail had to be smoothed and well drained. Where necessary, small culverts, made from ammunition boxes with the ends removed and fastened end to end were used. A brushwood mat laid beneath the Sommer-feld was necessary where the ground was very soft. The track was laid with the Coir matting on top of the Sommerfeld track. By careful maintenance of drainage and by keeping the matting and Sommerfeld well staked down, the limited life of the track was materially increased.

6. Bridging Lessons

1. General Policy

a. It was found to be of paramount importance to replace divisional crossings rapidly with good two-way bridges or culverts. Traffic density was normally greatest in the immediate rear of the forward troops, and the quick replacement of single-way bypasses aided enormously in the build-up of ammunition, etc., in forward areas.

b. In the replacement of divisional crossings, work was often duplicated by successive groups of engineers dismantling the previous group's work and replacing it with something better. An early decision as to the design of the final crossing saved much engineer effort.

2. Reconnaissance

a. It was emphasized that air photo interpreta-tion was complementary to ground reconnaissance, but could never replace it. Good photo interpretation was of great value to engineers in eliminating as possible bridge sites certain

stretches of an obstacle, thus cutting down the number of places to be visited and hence the time spent on reconnaissance.

b. Except in an approach march or in pursuit, engineer reconnaissance officers should not be attached to any specific forward unit. Such attachment often meant that an officer had to leave his radio behind and accompany the infantry on foot. A better method was to grant the officer a "free lance" role, his instructions merely being to reconnoiter specific points at the first opportunity. At other times, when certain tactical information was necessary for the initiation of his reconnaissance, it was often best for him to remain at forward infantry regimental headquarters until this information was available. It was found that radio communication was so reliable that a waiting reconnaissance officer could be on his way to any site within a few minutes of its falling into our hands. Moreover, it was thus possible for him to set out with much later and wider information.

c. It was found that only officers of considerable experience were capable of giving reasonably accurate estimates of time required to construct bridge approaches.

d. The use of special engineer codes for transmitting by radio details of equipment, stores, etc., proved invaluable.

3. Use of Mechanical Equipment

Not enough use was made of mechanical equipment for bridge building.

a. When used, cranes proved especially useful for tripling up Bailey bridges when 50 or 60 foot trusses were placed in one lift.

b. Dozers used as counter weights enabled the Bailey bridge to be launched without nose, and with far end posts in position. This method proved especially useful at restricted sites.

4. Technical

a. The timber crib type of abutment proved itself

to be the most satisfactory expedient for rapid bridging. Where sinkage was a possibility, it was found invaluable to erect, inside the crib, a trestle which took the major part of the bridge load.

    b. A quick form of temporary pier erected in water was produced in the following way:

    British V-trestling (a heavy trestle equipment with rapidly adjustable "camel's feet") was placed in the water from a light raft and leveled off. Steel girder capsills were placed across the top of the legs, and a pier of Bailey panels constructed on top of the capsills. This enabled the bridge to be launched and take traffic while a more permanent type pier was being constructed.

    c. Another pier quickly constructed in shallow water on gravel bed was made in the following way:

    A large grillage was laid down to take the pier which was constructed of steel bridging cribs with steel girder capsills. This proved to be satisfactory as a temporary job. To make it permanent, piles were driven in around the base of the pier and the whole erection concreted in.

    d. A ramp constructed of a single truss of Bailey panels lying on its side was a useful expedient for raising panels to the top of a pier.

    e. When double truss Bailey bridges have been reinforced by a third truss in the center and not over the full length of the bridge, it was found that, in time, the panels of the third truss tore at the transom seating, starting initially at the outside ends of the truss and working in towards the center, thus nullifying the reinforcement effect intended.

    f: It was found that tank transporters and towed trailers often damaged the end posts of Bailey bridges. This was partially overcome by setting heavy steel girders or heavy wood posts into the ground in front of the end posts. This was particularly necessary where the approach to the bridge was on a curve.

    g. In the Lombardy plains the rivers flood very rapidly and many floating bridges were lost. This was attri-

buted to two causes. The piling up of flotsam on the anchor cables, and the inability of the soft river bottoms to hold the anchors against the increased drag on the bridge. Replacing the normal anchor cables with steel wire ropes and making them fast to fixtures out of the water helped to overcome this difficulty. In addition, it was also found that cutting the bridge at the two half-floating bays and permitting the central floating position to ride out the worst of the flood on its cables, reduced the tendency of the bridge to twist and removed most of the strain on the shore ends. Bridge maintenance personnel had to be trained to carry this out very quickly owing to the speed at which the water rose.

h. It was found that if Floating Bailey equipment was transported with the pontoons on pole trailers (2 bow pontoons or one center pontoon on a trailer) and the normal Bailey components in 2½-ton trucks, there were always sufficient 2½-ton trucks to tow the trailers for any given length of bridge.

i. To replace a fixed Bailey Bridge with a semi-permanent bridge where a bypass was not feasible it was found that the Bailey could be raised and the new bridge built under it. This method stopped traffic for only two short periods first to jack up the Bailey and build new ramps, then when the semi-permanent bridge was completed to remove the Bailey. In some cases where it was planned to build a semi-permanent bridge and a Bailey was built first, the Bailey was initially raised to allow construction of the semi-permanent bridge.

7.   *Treadway Bridge Construction in Rapid Currents and Flood Water*

1. General

Engineers constructing Treadway Bridges under ideal conditions (low water and dry weather) tended to do just enough to insure the crossing. As a result, some bridges were

later lost when the river crest rose. On the other hand, bridges built during, and designed for flood waters, usually stayed in place, even after a rapid rise in the river level and current.

2. Choosing Site

Sites were frequently chosen too close to the demolished bridge. Due to the debris, the current was swifter and the turbulence greater just below the demolished bridge. It was often better to get farther away, even if it meant more work on the approaches.

3. Rapid Current

A fast current decreased the final load capacity of the bridge due to lack of stability. In the M-1 bridge, the floats tended to take water over the top resulting in a torque which kicked out the pontoons. To solve this problem, the treadway was offset 6″ on the downstream side and floats and saddles were lashed to the sections. The M-2 bridge was designed with the load center placed downstream and provided with a larger float with prows to remedy this defect. Trestle scour, another trouble caused by swift currents, was combated by excavating holes 12″ to 18″ deep for the shoes and then covering up the shoes with rock. If this was not possible during construction, personnel were kept on hand to "jack down" the columns on the shoes so that the trestles could scour themselves into the river bottom.

4. Maintenance

After a rise in the river, the following rules were constantly observed:

a. All cables and ropes were kept snug, not tight.

b. Center line was kept straight by constant adjustment of guy ropes and bridle lines.

c. Boats and saddles were lashed to treadway sections.

d. Transoms were kept snug against treadway.

e. Drainage was maintained around approaches and abutments.

Under normal conditions, upstream cables and bridle lines were more efficient than anchors in the gravel bottoms of most Italian streams.

By removing a few floats where the current was swiftest, resistance to the water flow was reduced and the bridge could be continued in use. This lowered the bridge capacity however.

Under flood conditions a treadway bridge could usually be held by anchoring with cables and deadmen at the ends of the bridge. Vehicle winch cables attached to the ends of a bridge in emergencies were of great value because if all anchorage failed, the bridge was permitted to swing parallel to the shore by paying out on the winches. When the flood subsided, the bridge was easily returned to its original site.

8. *Comparison of River Crossing Equipment*

1. Assault Boats:

a. *British Canvas Boats.*

(1) Easily portable (Could be carried open by four men).

(2) Easily maneuvered in the water when loaded.

(3) Easily damaged in transit by rough handling.

(4) Not easily repaired.

b. *U.S. Plywood Boat: M-2.*

(1) Not so easily portable.

(2) Easily maneuvered in the water, loaded or empty.

(3) Not easily damaged in transit (boats ''nest'').

305

(4) More easily repaired.

(5) Served dual purpose (i.e. making infantry support rafts and expedient assault boat bridge).

(6) Much noisier in use with non-rubber shod personnel.

c. *Conclusions*:

(1) The American pattern assault boat was decidedly more robust and had the great advantage of dual purpose. However, the British boat proved itself perfectly adequate for its primary task which did not require great durability.

2. Storm Boats:

a. *British Storm Boat.*

(1) Heavier to carry across country.

(2) Would carry greater load (6 pdr. or jeep. though latter a top heavy load).

(3) Carried ten men, but with a lower speed.

b. *American Storm Boat.*

(1) Carried by 6 men, (plus 2 for motor).

(2) Would carry up to 1500 lbs with very little reduction in speed.

(3) Carried 7 men (above crew) at maximum speed.

(4) Was the faster boat; would beach at full speed.

c. *Conclusions*:

(1) For assault crossing of personnel the U.S. boat carried fewer men but got them across the river and in action much faster.

(2) For cargo carrying, British boat carried a greater load but at a lower speed.

3. Light Floating Bridges:

a. *British Folding Boat Equipment. (FBE).*

(1) Class 9.

(2) Equipment complete with anchoring gear.

(3) Better performance in fast currents.

(4) Could be maintained in use indefinitely.

(5) Would take heavy traffic densities in vehicles per hour.

(6) Full width roadway.

b. *Light Treadway.*

(1) Class 7. (Could be reinforced to Class 9).

(2) Very quickly constructed.

(3) Required no special trucks.

(4) Difficult to anchor and hold in fast moving currents, and to maintain when moving debris was encountered.

(5) When made up to Class 9 offered more obstruction to water.

(6) No trestle equipment; therefore sites more limited than with FBE.

(7) Slow traffic.

c. *Conclusions.*

(1) The British FBE was definitely the superior bridge for all round performance.

(2) For short periods of use and under good conditions, the light treadway bridge would handle the same loads and was much more quickly constructed.

This last point is important, as in the initial stages of river crossings the speed of construction and the number of personnel exposed are of prime importance. The average floating bridge site is suitable for the construction of the floating treadway.

4. Heavy Floating Equipment:

a. *British Bailey Pontoon.*

(1) Most durable type of floating bridge.

(2) Practically no site limitations.

(3) Large water gap between piers, i.e. less stream obstruction.

(4) Pontoons were stable in high currents.

(5) Side girders gave additional confidence to drivers, but limited width of vehicles.

(6) Easy to carry especially when carried with pontoons on pole trailers towed behind lorries loaded with normal Bailey components.

(7) Would stand greater change in water level.

(8) Less undulation passing traffic.

b. *U.S. 25 ton Pontoon.*

(1) Limited as to sites.

(2) More stream obstruction.

(3) Would not stand changes in water level.

(4) Pontoons not usable in high currents, would swamp and sink even when fitted with bow adapters.

(5) Difficult to transport owing to unwieldy trailers.

(6) Had no width limitation for vehicles.

(7) More quickly constructed.

(8) Needed a crane for construction.

c. *Conclusions* - (See paragraph 5c).

5. Heavy Assault Equipment:

a. *U.S. Armored Treadway, M-1.*

(1) Could be reinforced to Class 40.

(2) More quickly constructed than M-2.

(3) Required special trucks or crane to construct. Therefore sites were limited or required preparation.

(4) Has trestle equipment.

(5) Would not carry wider loads, i.e. New TDs, 16 ton or larger trailers.

(6) Required fewer vehicles to transport than M-2.

(7) In high currents there was a large torque effect on pontoons. Treadways had to be offset downstream 6″ to counteract this.

b. *U.S. Armored Treadway, M-2.*

(1) Class 70 without reinforcement.

(2) Required special trucks: These had been designed to take M-1 treadway and would not handle M-2 nearly as quickly.

(3) Same site limitations as M-1.

(4) Would carry all loads.

(5) Required more vehicles to transport.

(6) Saddles were already offset downstream.

c. *Conclusions.*

(8) The Bailey pontoon bridge was the superior floating bridge of the semi-permanent type but took longest to become operative.

(2) The Armored Treadway bridge could not properly be compared with either the Floating Bailey or the U.S. 25 Pontoon equipment. It was the most rapidly constructed heavy bridge, either floating or trestle, and was a first rate bridge for tactical use.

9. *Snow Clearance*

1. A certain amount of preparatory work was found to be necessary prior to the winter season, as follows:

a. The constitution of a link work of snow posts with the responsibility of keeping open the main lines of communication.

b. The erection of snow fences to protect roads from drifts. Drifts nearly always form in the same places from year to year and interrogation of local inhabitants revealed these locations.

c. The erection of tall guide posts alongside the road to indicate at least one edge of the road, and where culverts etc. existed, both sides.

d. The stationing of mechanical equipment at strategic points.

e. The establishment of adequate reserve dumps of fuel for the mechanical equipment.

f. The issue of wooden snow ploughs to units living on main routes.

g. The dumping of crushed stone. All units under-estimated the amount of fine gravel needed to sand icy roads. On grades, stock piles should not be over 100 feet apart so that the road could be sanded from the piles.

(1) Fine crushed rock, that will pass a 3/4″ screen was best for ice.

(2) During a period of light daily thawing, large crushed stone, two inch was used. Sand was no good with a partial thaw during the day. The large stone was not completely covered and upon refreezing protruded to leave a rough surface.

2. Snow posts were so established and organized as to enable them to fulfil the following functions:

a. Assuming responsibility for clearance of a sector of main road or roads linking up with the sector of the next snow post.

b. Organizing manual labor, both civilian and military, to assist in snow clearance. Tools were held for working parties.

c. Reporting frequently state of road in its sector.

d. Rendering medical aid and limited mechanical aid to stranded men and vehicles.

e. Feeding and housing stranded men.

3. Units stationed on or near main routes could materially assist in snow clearance and were instructed to do so as follows:

a. By turning out all available men to work on the main roads.

b. If not required to work on main roads, those living on side roads cleared these to the main ones.

c. By towing wooden snow ploughs up and down the main roads, behind suitable vehicles immediately snow started falling. This method was of little use once any depth of snow had formed.

4. The most suitable of the more readily available pieces of mechanical equipment were found to be:

  a. The grader—for snow under one foot deep.

  b. The angle dozer—for all snow deeper than one foot.

  c. The jeep snow plough did good work in light snow on smooth roads but was not satisfactory for deep snow or rough roads.

  d. The snow plough for attachment to 2½ ton trucks proved satisfactory. It could be adapted to a 4 ton truck which, with its additional weight and power, would clear deeper snow.

5. Snow should be cleared off roads and beyond the ditches on either side of the road. If this had not been done, the lane cleared through the snow eventually became a canal for thaw water. If it was not possible to do this, then proper drainage channels were cut through the snow to permit thaw water to escape. Entrances to existing culverts were always kept clear so that thaw water from hillsides would not flow on to the road.

10. Mine Laying Policy

Troops of both the American 5th Army and the British 8th Army suffered numerous casualties as a result of their own AP mines. In numerous instances patrols, raiding parties, and advancing troops moved into their own indiscriminate or poorly charted mine fields. There were some instances where extreme emergencies justified the laying of indiscriminate AP mine fields, but in many other instances, indiscriminate or poorly charted mine fields were laid without such justification, and resulted in many needless casualties.

In the Fifth Army AP mines were usually laid by infantry troops under the supervision of division engineers. The engineer personnel were then responsible for the proper charting of the mine field, and distribution of this information to the proper headquarters. At times, when engineer personnel were not available for supervision, AP mine fields were laid by infantry battalion Ammunition and Pioneer platoons

or by the mine platoons of infantry regimental Anti-Tank Companies. These troops were usually well qualified to lay AP mine fields, but in many instances they were inaccurate in charting the size and location of the mine fields. Also, the headquarters which ordered the laying of these mine fields, at times failed to transmit the proper information regarding the mine fields to higher and lower headquarters and to relieving units.

It was the belief of most Engineer Officers in Fifth Army, that AP mine fields should be laid only by authority of Division commanders, and then under the supervision of engineer personnel.

It was the opinion of most infantry regimental and battalion commanders that, except in extreme emergencies, AP mine fields should never be laid without the authority of the infantry regimental commander, and that when possible supervision should be exercised by supporting division engineer personnel.

All engineer and infantry officers were agreed that the utmost care should be taken in accurately charting, and in distributing information, pertaining to all mine fields.

The mine experiences of the British Eighth Army were similar to those of the American Fifth Army. The British developed a policy which required approval by the Division 'G' Staff prior to the laying of any mine fields.

11.   Importance and Best Methods of Recording Minefields

1. It was of great importance that all minefields be accurately recorded for two main reasons:

a. That units in the area, or who might move into the area, could be notified of their location.

b. That engineers required to remove the mines would have a complete and accurate record of type and pattern. Accurate minefield records, when in the hands of the units

concerned, saved lives and simplified the clearing, both in forward and rear areas.

2. The method laid down by AFHQ for recording and marking minefields was entirely satisfactory. It was found necessary to require experienced engineer personnel to record minefields, regardless of the type unit laying the mines.

3. Minefield records should be classified lower than SECRET when possible, inasmuch as it was often necessary for the information to be in infantry battalion or lower headquarters.

12. Mine Detection in Forward Areas

No new methods were developed in mine detection during the Italian campaign although numerous devices for mine clearing were developed. No satisfactory substitute was found for visual detection, the SCR-625 mine detector, or the probe. Although these methods were slow and required large numbers of personnel, they were most reliable. The use of war dogs for mine detecting was so unsatisfactory that the only war dog company to arrive in this theater was returned to the United States.

13. Mine Clearance

It was frequently found necessary to emphasize the prescribed methods of clearing mines in order to counteract the natural tendency toward carelessness which was bred by familiarity. Among the standard precautions which required repetition were the following:

    a. Only one man should deal with a mine.

    b. Mines are just one of the normal risks of war.

    c. When in doubt, get skilled help.

    d. Observe the ground carefully when moving through a minefield.

e. Mark and report an area or lane cleared.

Short cuts were hazardous and often resulted in casualties. Some of the mistakes were:

    a. Bunching together.

    b. Running in a minefield.

    c. Becoming careless or over confident.

    d. Rushing into a minefield to help a man who has been injured.

    e. Forgetting to look for booby traps.

    f. Experimenting with new and unfamiliar mines.

Headquarters planning assaults often did not take into consideration the time necessary to remove mines. As a result, either the assault was delayed, or personnel and equipment were lost unnecessarily.

"Snakes" were occasionally used to clear gaps in heavily mined areas. However, they required comparatively flat terrain for assembly and movement to the mine field. The time required for their assembly and employment was usually too long for use in a fast moving situation.

Such specialized vehicles as the SCORPION and the TIE-3 were of little value during most of the Italian campaign because of the ruggedness of the terrain. However, U.S. and British experience with these vehicles under suitable conditions of firm, flat terrain and dense minefields, as in the Liri and Po valleys, proved these vehicles to be excellent for mine clearance.

The use of detonating cord cables proved of greater value in clearing gaps through AP minefields, than any other method devised.

14. General Lessons on Camouflage

1. Nets

    a. Experience showed that the pre-garnished fish nets received were of insufficient density. Between 90% and 100% garnished nets were most satisfactory.

    b. Flat tops were seldom erected because net drapes blended better with the Italian terrain.

c. Colors of summer and fall nets proved satisfactory but no satisfactory winter net was developed.

d. Shrimp nets were unsatisfactory unless the object to be concealed was in deep shadow, because these nets were not of sufficient density to obscure properly.

e. Regardless of the care given nets, they were not sufficiently durable nor fire resistant.

2. Pattern Painting

Continued studies by camouflage officers of enemy methods of pattern painting bore out the general ineffectiveness of such painting to conceal installations. Aerial photos and air observation of large scale painting projects, bore out the contention of field camouflage officers that such painting merely tended to make the structures more conspicuous as military targets. The painting, however, did tone down the structures when dark colors were used.

3. Screens

a. For all general screening purposes, double thickness (superimposed) garnished nets, with the garnish thickened round the edges, were used.

b. Where a white surfaced road was to be screened from an elevated viewpoint, the screens were so arranged that each screen covered the next one by half, so that at any given point there were two screens between the object and the viewpoint.

c. Where possible, traffic was made to keep to the far side of the road from the screen so that it would be silhouetted against the darker fields rather than against the lighter road.

d. In cases where traffic would be silhouetted against a low sun, it was preferable to close the road during those hours rather than to thicken up the screens more than was necessary for normal conditions.

4. Deception

a. When planning an offensive in one sector west of Florence, a policy of rigid concealment was inaugurated to

deceive the enemy as to the location of the attack. Dumps, hospitals, emplacements and communication improvements were "played down" to the greatest possible degree. In an adjacent sector, the appearance of great activity was created by the construction of dummy bridges, dumps, field pieces, airfields and other installations as well as by the use of gun flash simulators. This program was designed not so much to deceive the enemy as to location of installations, but rather to confuse him about a whole offensive operation.

b. To cover a bridging operation taking place farther upstream the following plan was carried out at a site on which the Germans had accurately registered with artillery fire:

Camouflage screens were erected on frames, the night before, and several Bailey panels were left protruding, not too obviously, from behind the screens. On the night of the operation a small party well dug in, produced the effects of bridge building by hammering panels, flashing lights and shouting "commands".

The Germans responded with very heavy defensive fire all through the night, meanwhile the main bridging operation two or three miles away continued unmolested.

c. A Bailey bridge was shelled periodically until an obviously damaged vehicle was left on it. This was removed each night to allow traffic to pass, and was replaced before dawn. The bridge was not shelled again.

5. Camouflage Discipline

Experience showed that not enough emphasis was placed upon concealment from ground observation. In general the camouflage of the infantryman was satisfactory but that of tents, buildings, vehicles or other installations was not.

15.   Camouflage of Vehicles - Disruptive Painting

The general consensus of opinion among camouflage officers was that pattern painting was of dubious value because:

    a. Varied terrain in Italy made standard patterns and colors impracticable.

    b. When a unit was shifted from one sector to another, as was often necessary, their patterns and colors were revealing rather than concealing. Repainting before a move was nearly always impossible because of insufficient time.

    c. Security was lost and units easily identified when units moved to different sectors.

    d. Camouflage paints and personnel for supervision were often not available.

    As a result of extensive study and experiment, all disruptive painting of vehicles in this theater was discontinued, except where specifically directed for a particular operation. The British discarded pattern painting of vehicles in favor of a lusterless olive drab.

16.   Engineer Supply System

1. The U.S. system of engineer stores supply proved unsatisfactory. There was no organization designed to, or capable of, handling engineer stores either at division or at Corps, with the result that individual units had to draw direct from the Army depot. There were many disadvantages to this system, of which the following were most prominent:

    a. The division or corps engineer had no direct control over supplies. Unit demands often had to be referred back from Army to the Engineer concerned before the unit priority could be established.

    b. The division or corps engineer was not always fully aware of the resources at his disposal when planning an

operation, because emergency or unanticipated demands from other Engineers could seriously affect the dump stock. This was obviously a grave defect especially when the operation was of a mobile and fast moving character.

    c. The time taken to get supplies to the front was much longer than if division dumps had been provided and located well forward. Units had to send their own transport back to collect their supplies, and an average time for the round trip was one day. At the times when the need for engineer supplies was most critical, units usually could ill afford to spare the transport for so long.

    d. To overcome the disadvantages in (*c*) above many units operated small dumps of their own, which, apart from being an uneconomical distribution of engineer stores, was also a function they were not equipped to carry out.

    2. Under the British system, each divisional and Corps engineer group had its own field park company, which in addition to other functions, was a mobile stores handling unit. Dumps were operated at Army, and at Corps (by the Corps field park company). The divisional field park company rarely operated dumps during mobile operations. Transport was held at the various levels, at scales consistent with operational demands, for ferrying supplies between Army, Corps, and Divisions, the basic principle being that responsibility for delivery to one unit rested with the unit immediately in rear. However, with the proviso that the stores were invariably delivered to the user at the site required, this system was varied to provide the most economical use of transport.

    3. A supply organization operating on the British principle was desirable to facilitate planning, control, and distribution of Engineer stores. This would necessitate changes in organization similar to the following:

    a. At Division, the addition of sufficient personnel to maintain engineer supplies for divisional troops.

    b. At Corps, an engineer supply section for control,

allocation and statistics only. This section would control stocks of divisional dumps and check and amend divisional requisitions as required, forwarding them to Army. No stores would be handled at Corps level.

    c. At Army, the addition of sufficient personnel and transport to supply, on requisition through Corps, direct to divisional and corps engineer units.

17.   *Carriage of Bridging Equipment*

    There was a definite need for Bridge Companies designed to carry special bridge equipment.

    In the campaign in Sicily, Corps Engineers organized a provisional Bridge Train utilizing Corps troops, and Corps and captured German transport.

    Upon entering the Italian campaign no bridge company was available except the Armored Treadway Company of the Armored Division. A unit of this company landed with Fifth Army to serve as a Bailey Bridge Train. However, Army soon received more Bailey bridge equipment and as the use of bridging materiel increased this unit proved inadequate. To fulfil this need, two companies of a General Service regiment were assigned additional transport, thirty-one 2½-ton, 6 x 6, trucks and six Brockway trucks to each company, and utilized as bridge trains. One company was attached to each Corps and served in that capacity until Army was authorized to activate two bridge companies.

    On one occasion a Division anticipated a heavy demand for Bailey bridges. By coordination with supporting Corps Engineers transport was taken from all units concerned and formed into three bridge trains.

    Fifth Army eventually formed two bridge companies organized from the disbanded bridge train of the armored division. One of these companies was attached to each Corps and handled both Armored Treadway and Bailey bridge. These units proved satisfactory in supplying Corps needs when they were properly supported by Army, but Army lacked a

proper organization to handle bridge equipment at Army level. This need was met by using the Heavy Pontoon Battalion to handle Bailey bridge equipment for Army and support the Corps Bridge companies. It was found that Army needed one bridge company to support each Corps bridge company.

It was also found that whenever a new type of bridge equipment was adopted it was essential that Bridge Companies be formed to handle it.

18. Small Unit Dumps

All engineer units maintained a dump of engineer materials. As a rule these dumps stocked only construction materials for culvert or bridge building, and for field defenses. They were usually stocked with material which was overage from construction projects. In the case of division engineers, however defense materials were stocked by requisition because of the necessity for immediate supply to the infantry units.

Small unit dumps were necessary because the interval between the assignment of a project to the unit and the required completion time was frequently too short to permit requisition of necessary materials through channels and delivery to the site. By carrying a small amount of materiels on hand, any project could be started immediately upon receipt of the work order. Materials for completion usually arrived through normal channels by the time they were required.

The Army depot had considerable difficulty with units moving forward and abandoning small dumps without notifying the depot. In a rapid advance it was the policy of the depot to pick up any small dumps that units had to abandon. To do so it was essential that the depot be notified of the fact that a dump was abandoned and its exact location. A list of the dump contents was also of value to the depot.

19. Engineer Equipment

1. Employment

a. The speed with which road nets were opened by engineers often directly determined the rate of advance of the

army in an attack, or pursuit. In most cases the rate of engineer progress was likewise determined by the type and availability of their equipment. This was particularly true in the rugged terrain encountered in Italy.

b. It was impossible to maintain the roads, construct the dumps and railheads, repair and rebuild the bridges, or improve the Army installations required by a mechanized Army, without the maximum use of mechanical equipment. Without mechanical equipment, the manpower required was prohibitive, and, besides, hand labor could not have performed the work in the allotted time.

2. Holding

a. The U.S. practice of making larger organic allotments to construction units than the British proved very sound. It was found that engineer construction units, in order to fulfil their varying missions, need a flexible policy in the assignment of equipment to units.

b. In the Italian theater the rough terrain encountered necessitated the continual use by Engineers of more heavy equipment than was authorized, but until the latter part of 1944 no equipment company was available to supplement unit needs.

c. Experience indicated that equipment companies should be used primarily to supplement the equipment of supported units, when needed, and secondly to supply the special equipment which was used only occasionally. It was found that the equipment company was the proper unit to which to assign new types of equipment or additional equipment needed to fulfil work requirements. In equipment companies the need for flexibility was even greater than in construction units, as the equipment company had no work platoons or other men it could divert to use as operators when it was given equipment above that authorized. An equipment company supporting a Corps needed different types and amounts of equipment than an equipment company suporting Army Engineers.

3. Types and General Use

a. Division Engineers if given close support by Corps Engineers seldom had need for additional equipment from an equipment company. During the winter they did need additional dump trucks and often needed a primary rock crusher and a gas shovel. However, when these last two items were available to Corps troops they were often shared with divisions.

b. Corps troops' needs from the equipment company were light during the summer but very heavy in the winter. The additional equipment required was the same as that required by division engineers.

c. Army troops, because of the big jobs they were continually required to execute, had a continual need for all types of extra equipment. Here again the demand was especially heavy during the winter for more dump trucks, crushers, and gas shovels.

4. Maintenance

a. Engineer first and second echelon maintenance was generally poor, and constant emphasis had to be placed upon its performance. Lack of proper maintenance by using units increased the burden on third and fourth echelon maintenance facilities. Maintenance unit records showed many cases of damaged equipment directly due to lack of first and second echelon maintenance, improper use of equipment, and careless and incapable operators.

b. Engineer third and fourth echelon maintenance was very unsatisfactory due to several reasons:

(1) No Heavy Maintenance Company was available to Fifth Army.

(2) For some time only one platoon of a Medium Maintenance Company was available. This platoon was later replaced by a Medium Maintenance Company, less contact platoon. Considering the number of units to be served, three maintenance companies would have been the normal allotment for Fifth Army.

(3) The maintenance burden was further increased by the fact that all the units serviced were using additional equipment. Some units were operating three times the amount of equipment normally authorized. Also, as the engineer work was heavy and much equipment was old, breakdowns were frequent. These factors all combined to give the Maintenance Company several times the amount of work it was equipped to accomplish.

c. Supply of parts was inadequate, causing many pieces of needed equipment to lie idle for long periods. This was due to several reasons:

(1) Spare parts kits authorized on the basis of one for each piece of equipment were not available. In an effort to distribute equitably the available kits, Theater changed this authorization to one kit for each three pieces of equipment, but actually only very few kits were made available.

(2) Lack of trained depot personnel caused excessive inefficiency. Many critical items were stored in depots and "lost". Shipping tags got torn from packing cases and inexperienced personnel were unable to identify the contents without opening the cases.

(3) A Parts Supply Company was not available to receive and make proper distribution of parts.

5. Conclusions

a. Nearly all engineer problems in Fifth Army were influenced throughout by the lack of sufficient engineers of all types. This especially aggravated the equipment problem, as the insufficient number of construction units made additional equipment per unit necessary in order to accomplish the required work. Also, no equipment companies were available until late in 1944 when one company was assigned to the Army. There were never sufficient maintenance units. Thus all Engineer units were required to do work beyond their intended capacity. No proper conclusions can be drawn on engineer problems without keeping this fact in mind.

b. In combat areas the necessity for large allotments of equipment was great because the work in these areas in most cases had to be accomplished quickly and completed by a prescribed time in order to secure satisfactory results.

20. Special Vehicles vs. Normal 2½ Ton 6 x 6 Trucks for Carrying Bailey Pontoons

When loading or unloading the British Pontoon Lorry, all handling was done by hand. When using a normal 2½-ton truck for hauling pontoons a crane was necessary to load and unload. Under normal conditions pontoons were loaded on, or unloaded from, the special Pontoon lorry faster and with less damage than when hauled on standard trucks and handled by cranes. The standard truck will carry the same load (two sections) as the pontoon lorry without damage to the pontoons in transit; however, the cranes used in loading and unloading the standard trucks often caused pontoon damage.

Pontoons and superstructure should not be carried on the same vehicle. Pontoon loads and bridge loads should be kept separate.

A Brockway type truck would be ideal for handling and hauling pontoon sections.

Most bridge sites were too restricted for the use of trailers or even semi-trailers.

21. Armored or Assault Engineers

It was considered that there was a definite need for specialized armored vehicles, capable of overcoming obstacles and defenses, and affording protection to the crews and operators. Such vehicles proved to be invaluable in the British Army, having materially assisted mobile operations in the difficult plains of Lombardy, with their frequently recurring irrigation ditches. It was felt that armored vehicles similar to the ARK, the AVRE, the CROCODILE, and the CRAB

would have been of equal value in the U.S. Army. Although both British and Americans were agreed upon the necessity for these armored assault vehicles, there was some difference of opinion on the method of holding and operating this type of equipment.

One line of thought considered it wasteful to form special units to operate these vehicles, which would only be used on special occasions. Those supporting this viewpoint felt that, just as prior to a river crossing where engineers and infantry train together with special river crossing equipment, so should engineers, crews of special assault vehicles, and infantry train together before an operation involving the use of armored assault vehicles. The necessary units (companies or battalions) of combat engineers should be trained and used for assault operations as required, reverting to their normal role when no longer needed. Under such a method of operation, the assault vehicles would be held in engineer depots, kept normally in an Army pool, and operated, when issued, by tank personnel. Although the above represented their basic conception as to the general method of holding and operating this equipment, it was agreed, however, that a unit of armored assault engineers should form an integral part of the armored division.

The opposite line of thought favored the organization of assault units similar to the British system under which armored or assault engineers were formed into assault brigades, consisting of one armored regiment, RAC, and two armored regiments, RE. The armored regiment RAC was equipped with flame throwing and flail tanks while the armored regiment RE had ARKs, AVREs, and tank dozers. This system had the great advantage of producing technically and tactically trained, self administered and controlled units, working under their own commanders, and capable of being put in support of a formation at very short notice. It was considered that in mobile operations these units would be continually employed, this being borne out by experience gained during their short spell in action in the Lombardy plains before operations became static. Experience of the Eighth Army showed that one Armored Engineer

regiment in an Army was insufficient. At least two regiments were considered necessary. The strength of each regiment was 36 officers and 597 men operating 18 ARKs, 18 AVREs, 18 tank dozers, and 3 Armored Recovery units. Armored engineers had to be employed in squadrons or at least half squadrons. They worked as mixed teams of ARKs, AVREs, and dozers. Tactical training and tactical command were both necessary. Furthermore, the armored engineers were never employed equally distributed throughout the formations of the Army. They were always wanted where the main effort was made, and subsequently, in the event of a breakthrough, with the Armored Division.

Experience in Italy was insufficient to provide the basis for a final conclusion as to whether armored engineers should form part of ordinary combat battalions or should be grouped in special battalions. Experience in their employment in all theaters should provide the basis for any decision as to the form of their final organization.

22. Comparison of U.S. and British Water Supply Equipment

1. Purification

The American coagulant sand filter process could operate with higher turbidites than could the British diatomaceous earth process. As a result, much greater production could be attained by the American process.

2. Tankers

The American allocated the 250 gallon 2-wheel tank trailer to organizations and reserved the tank trucks (700 gallons) and semi-trailers (1,500 gallons) for hospitals and water hauling companies. Small unit water hauling was accomplished by the use of five gallon cans carried in any vehicle.

The British assigned their tank trucks (250 and 420 gallons) and 150 gallon trailers to organizations. These trucks

and trailers were fitted with small filters and were independent of water points. Because of their smaller capacity less efficiency per man-truck-trip resulted. The British had no provision for large capacity long hauls and did not operate dry distribution points.

3. Booster Pumps

The American direct drive 55 GPM pump was a reliable, sturdy pump.

The British variable length, flexible drive 40 GPM pump was excellent for it allowed pumps to be immersed in a source below the suction lift (25 ft) of the standard pump. In addition, two or three pumps could be connected on one drive shaft in series to furnish double or triple the head, or in parallel to furnish increased flow.

4. Storage Tanks

The 3,000 gallon American canvas tank with staves was very satisfactory because of its large capacity, small leakage, and the flange outlet in which to couple discharge hose.

The British 1,500 gallon canvas storage tank leaked badly and had no provisions for coupling discharge hose.

5. Hose

The American 1½", 2", and 2½" rubber hose wore well but occasionally developed blisters inside. The canvas 1½" discharge hose was of good quality but had high friction loss.

The British armored 2" hose was superior in performance and durability. The canvas 2" hose was inferior in weave and wear.

6. Chlorination

The Americans chlorinated at the water points either with gaseous chlorine or hypochlorite. For clear waters, they used automatic line hypochlorinators, gas "wall" chlorinators, or improvised drip chlorinators.

The British chlorinated purified water by hand, the tank truck driver adding hypochlorite powder and sodium thiosulphate.

The British starch-iodide test for chlorine residual was more qualitative, while the American disc comparator was more exact.

23. Division Engineer Battalion

1. Personnel

a. It was necessary to operate a battalion engineer supply dump which stocked field fortification materiel for the use of infantry units. As no personnel was authorized to operate these dumps, additional personnel had to be attached to the S-4 section.

b. Because it was necessary to build and maintain roads in the division area as well as to support the three regimental combat teams, the three companies had to be divided between four missions. This resulted in greatly decreased operating efficiency and overburdened all personnel. The addition of a fourth company to the battalion would have added materielly to the operating efficiency. This would have allowed a more permanent assignment of engineer companies to support RCTs and would have resulted in better teamwork. It would also have reduced the amount of help that was continually required of Corps Engineers for strictly division work.

c. There was usually at least one officer of each company either sick or away on SD or TD. As most jobs required the presence of an officer, regardless of the number of men required, the five officers of each company were not sufficient.

2. Equipment

a. It was felt that 2½ ton 6 x 6 dump trucks should be substituted for the authorized cargo trucks as the majority of engineer hauling was of materiels which could more efficiently be dumped than unloaded by hand. A dump truck could

always substitute for a cargo truck but a cargo truck was never a good substitute for a dump truck.

b. Most roads in the Italian theater were of earth or gravel, and a motorized grader for each battalion would have greatly facilitated maintenance.

24. Organization and Equipment of Treadway Bridge Company

1. Personnel

Assistant drivers were needed for Brockway trucks. When bridge requirements were heavy, trucks were often in continuous operation from 24 to 36 hours.

2. Equipment

a. Two R/4 dozers were authorized. D-7 dozers would have been much more efficient. One of the main uses for a dozer in this organization was to pull mired Brockways out of the mud and an R/4 could not do the job.

b. One half-track as authorized was not needed.

c. Company needed two 3/4 Ton Weapons Carriers; one to supply water and rations, and one for use as maintenance vehicle, to haul parts from ordnance and take parts and repair crews to vehicles broken down on the road. Without these it was necessary to use 2½ ton trucks from the bridge train.

d. Brockway trucks were preferred to 2½ ton trucks for hauling Bailey Bridges. The 2½ ton truck could not be unloaded at the bridge site as quickly, and the men required to unload 2½ ton trucks could be better employed on bridge construction.

e. Allotment of Brockway and 2½ ton 6 x 6 cargo trucks was satisfactory.

f. A bridge train's worst problem was the maintenance and replacement of Brockway trucks, caused by theater shortage of parts and vehicles.

25. Heavy Pontoon Battalion

1. The greatest problem of the heavy pontoon battalion was the maintenance and replacement of equipment. This was due largely to two causes:

a. There was only one such unit in the theater and supply stocks were critical.

b. There was a lack of standardization in the manufacture of many items such as trailers, prime movers, cranes and bridge parts. As a consequence, it became necessary for the battalion to manufacture numerous replacement parts.

2. An important expedient developed to prevent the uneven and excessive settlement of trestle shoes in soft bottoms was a 4' x 20' rigid mat of timber and steel members on which the trestle shoes were placed. This mat provided sufficient bearing on the soft soil for the loads carried over the bridge.

3. As the heavy pontoon bridge was seldom used operationally in this theater, the heavy pontoon battalion was used as an adjunct to the Bailey Bridge depots. It was possible to carry two standard Bailey Bridges on the vehicles of one company of the battalion.

26. Engineer Light Equipment Company

Although the organization of the company was entirely satisfactory to operate its authorized equipment, great difficulty was experienced trying to provide operators for additional necessary equipment assigned by special authorization. It was found that an authorization for additional equipment should be balanced by an appropriate increase in personnel, when this equipment was to be permanently retained by the organization.

It was found that the number of dump trucks assigned the company was too small to be of any real benefit, and it was

generally felt that an equipment company did not require dump trucks. In Fifth Army, the Equipment Company dump trucks were assigned to other units, while the truck drivers were retained to operate extra equipment assigned the company.

To obtain better and more efficient maintenance of equipment, the following additional items of maintenance equipment were required:

a. A heavy engineer shop truck. With a borrowed shop truck the company was able to repair nearly 100% of its own equipment, thus reducing the burden on the medium maintenance company. The equipment company had men capable of making such repairs but were not authorized the tools and equipment. Many small parts often not available were made in the heavy shop truck.

b. A charger, battery, portable, 12 volt, 2,000 watt, gas engine drive. Because of the large number of batteries, both six and twelve volt, in the company, the authorized battery charger could not service the batteries as rapidly as was needed.

c. A valve grinding and refacing machine. The lost time required by evacuation of company equipment to engineer maintenance companies for this work would have been eliminated.

d. A compressor, air, portable, gasoline drive, 3/4 HP, six cu. ft., complete with hose. The 4 CFPM air compressor was not sufficient to service the large number of vehicles in the company.

27. Engineer Medium Maintenance Company

Serious difficulties were experienced in the maintenance of engineer equipment within the Fifth Army as only one maintenance company was available to do all the work that normally should be done by three maintenance companies. Because of this, and the fact that much of the equipment in the hands

of units was old and the operational demands on that equipment were heavy, breakdowns were frequent and the company was greatly overburdened. As a result, during the last half of 1944, an average of fifty pieces of equipment were on the "waiting line". In addition, the supply of spare parts was insufficient. This caused unnecessary delays in returning the equipment to units and resulted in overcrowding of shop space because of partially dismantled equipment awaiting parts. If left in the open such equipment was exposed to dust in summer and rain in winter.

To increase the work output the following additional equipment was needed:

a. For main shop.

(1) Press hydraulic, track, gasoline driven for rebuilding tracks.

(2) Milling machine for rebuilding gears.

(3) Power hacksaw.

(4) Cleaning unit, steam, oil burning for cleaning equipment and assemblies.

(5) Quickway crane. The 10 ton wreckers were limited in the height of lift, it was difficult to maneuver the boom, and they often were not available because it was necessary to use them as primemovers.

(6) Three ordnance parts vans, semi-trailer. It was necessary to store and transport large quantities of parts.

b. For contact platoon.

(1) Lubricator, trailer mounted. Because of the large quantities of equipment to be serviced in the field, hand lubrication methods were impractical.

(2) Gasoline tank trailer, 500 gallons. Large quantities of gasoline were required, and the transport and hauling of 5 gallon cans was inefficient.

(3) Water trailer, 250 gallons. Refilling radiators required a large volume of water which the allotment of 5 gallon cans did not provide.

(4) Valve grinding set. Time and labor were

saved by grinding valves on the job and eliminating the necessity of returning equipment to the company shop.

(5) Typewriter. Records and requisitions were required to be typed although the platoon was operating in the field.

28. Engineer Camouflage Battalion

Although a camouflage battalion was authorized for each Army, there were never more than two companies in the theater at one time and only one company after the middle of 1944. Camouflage units with Fifth Army did excellent work. They were often given jobs that required a great deal of imagination and proved to be very good at improvising. They were often required to do more labor than organized for and it was felt that operation would have been more efficient if camouflage companies had been enlarged to approximately the strength of a combat company and made separate units under Army control.

Camouflage units were organized for the supervision, inspection, planning and supply of camouflage projects executed by the troops of the activity or area being camouflaged. However, within this theater approximately 80% of the camouflage work required was operational. It was necessary for the camouflage company to perform nearly all of the labor on projects. As a result, the company as organized had insufficient men to perform adequately the necessary camouflage work, and was required to procure assistance either from other branches or civilians.

Camouflage units were considered non-combatant and organized from older and limited-service men. Inasmuch as the great majority of camouflage requirements were with front line units the operating efficiency of the units was impaired.

It was found that insufficient transportation was authorized for the camouflage company. It was not practicable to rely on other units for transport of supplies and equipment to job sites. The 3/4 ton weapons carrier authorized could not transport the large amounts of materiels and equipment required.

29. Engineer Dump Truck Company

1. Personnel

a. Assistant drivers were needed for the company trucks. Using units generally desired the trucks to operate two shifts a day. This could not be done without deadlining some of the trucks to provide the additional drivers. The records of one company indicated that one-third of its truck-days was night work.

b. Because the company is an independent unit it was necessary to divert one man from his normal duties to act as assistant supply sergeant.

2. Equipment

a. Dump Trucks.

(1) Short-wheelbase trucks would have been more efficient, as they are easier to turn around, load is better distributed, and fewer front springs would be broken than with long-wheelbase trucks.

(2) Inasmuch as winches were seldom needed, it was felt economy could be effected by providing sixteen winch-trucks (two per squad) rather than having all trucks in the company equipped with winches.

(3) The slope board over the cab was found to be too light to be effective. It broke off too easily, and should be left off or made stronger. Most units found little need for it.

b. Organizational Equipment.

The following additional equipment was found highly desirable:

(1) One portable air compressor.

There were fifty-three vehicles which had to be greased and painted, and whose tires had to be repaired. During peak operations, the company repaired an average of thirty tires daily, and it was often necessary to repair as many as fifty per day. With only one air compressor, this meant that vehicles had to wait in the motor pool while tires were

being repaired when these vehicles were vitally needed on the job. Quite often the company was divided into two groups with platoons operating for different organizations. This left one platoon without a compressor which aggravated the difficulties.

(2) One 3 KW Generator.

The generator was needed for illuminating the motor pool in order that mechanical work could be carried on at night. During pressing operations, the company operated two shifts per day. This required that mechanical work and tire repair also be operated in two shifts to provide proper maintenance.

30.   Engineer Depot Company

There was no engineer depot company in the theater during the Italian campaign. Depots which were established, were operated by detachments organized within the theater. As a result of not having available properly organized and trained personnel, there was constantly an overburdening of the detachment. Until early in 1945, Army engineer depots were operated by a platoon which was augmented by attached labor, either soldier or civilian. Trained personnel familiar with all items of engineer supplies were not available. This fact made engineer operations more difficult and often made supply distribution inefficient.

Maintenance of depot operating equipment was difficult because no repair personnel was authorized. It was necessary to divert sufficient men from other duties to maintain this equipment.

·Although the depot detachment was organized specifically to operate only one Army engineer Class II & IV depot, it was occasionally necessary to operate more than one. When more than one depot (four at one period) was operated, the difficulties of administration and operation were correspondingly multiplied.

31. Engineer Topographic Company

There was only one topographic company to service the entire Fifth Army, although the normal contemplated allotment of topographic units was one company for each Corps and one battalion for each Army. As a result, this company was constantly overburdened. Because of the abnormal requirements made of this company, the following difficulties were encountered:

a. It was impossible to produce the required amounts of work with the equipment authorized. The normal company equipment was augmented so that it was operating nearly the amount authorized for a battalion.

b. Although additional men were not available to operate efficiently on a two shift basis, this was partially overcome by training men in two or three different jobs so that they could be substituted where necessary. However, this practice greatly overburdened the men because of the specialized type of work they were required to do. As a result, the jobs were done much less efficiently.

c. All supply stocks were always critical.

It was felt that if each Corps had its own topographic company, an enlarged company of approximately 200 men could adequately handle the requirements of the Army.

The survey platoon, because of its type of work, always operated away from the company. Many problems of administration and supply were encountered. Since little work of the survey platoon concerned the other two platoons of the company, it was felt that more efficient operation would have been achieved had all ground survey platoons been organized under a centralized controlling unit.

No provisions had been made for reproduction of non-topographical materiel such as posters, charts, holiday greetings, pamphlets, etc. However, the topographic company was frequently required to reproduce these miscellaneous items.

32. Water Supply Battalion Operations

A. PRODUCTION.

1. Mobile Unit

     a. Engine exhaust was initially piped through the roof resulting in illness and inefficiency of the operator as well as the danger of the hot gases burning the camouflage net. This condition was remedied by altering the exhaust pipe so that the hot gases and fumes were piped down through the floor,

     b. Water pressure gauges, as mounted on the pump discharge pipe over the engine, failed frequently due to excessive vibration. These breakdowns were remedied and the gauge made more accessible to the operator by mounting it on the control panel and connecting it to its original fitting with a length of copper tubing.

     c. By removal of a stop-lug inside the 5-way valve cover, the simultaneous use of the chemical feed and filter in pre-settling and pre-flock processes was accomplished. This change resulted in the more rapid processing of water.

     d. The entire water purification unit was removed from its truck and mounted on a trailer improvised from the rear portion of a salvaged GMC 2½ ton 6 x 6 truck. This trailer-mounted unit was entirely satisfactory both in mobility and efficiency of operation.

2. Booster Pumps

     a. There were often instances where the water requirements were greater than the capacity of the standard 55 GPM booster pump. It was necessary to improvise combinations of two or more pumps to do the same job that a single, larger capacity pump could have accomplished much more efficiently. A variety of larger pumps could well be included as organic equipment.

     b. There were many operations requiring the lifting of water from sources inaccessible to the standard pump. As

a result these sources either could not be utilized or an unsatisfactory improvisation was made by combinations of pumps. If a variable length flexible shaft which could operate around corners, or allow the pump to be immersed in a source below the suction lift of the standard pump had been available, such sources could have been utilized.

B.   DISTRIBUTION.

1. Frames of the GMC 6 x 6 tank truck had about 30% breakage at the hole through which the gasoline line passes. The frames were strengthened by the using unit by welding reinforcing plates on the frame at the breakage point.

2. Vibration of the radiator of the truck-tractor caused leaks to develop. This was partially corrected by insertion of a strip of salvage rubber hose between the radiator and its mounting.

3. Inadequate supports for the rear fenders of GMC 6 x 6 tank truck resulted in much breakage of fenders and supports. This was corrected by welding the ends of a long strap iron, passed over the tank, to the fenders.

4. Racks of iron bars and angles were installed on the walkway of tank trucks to permit the hauling of miscellaneous equipment.

5. The use of 2½ ton dump trucks in place of the cargo trucks authorized would have facilitated operations because of the necessity for the construction and maintenance of water point access roads.

C.   WELL DRILLING.

1. Due to the mobility required of the well drilling rig, the skid mounting was unsatisfactory. This was overcome to a certain extent by mounting the rig on a standard 8 ton trailer. More mobility could be achieved by mounting the rig on a truck.

2. No provision for a supply of water for lubrication of drilling tools was made with the rig as issued. Inasmuch as water is seldom available at the drilling site, a 500 gallon water tank was procured and mounted on the drilling rig.

3. Operations would have been expedited had a greater variety of hand tools been furnished with the drilling rig.

4. Construction of a large tool box on the trailer "kick up" permitted convenient stowage of parts, tools and miscellaneous equipment.

5. Operations of the well drilling section would have been more efficient if they had as organic equipment a rear winch truck similar to that issued petroleum engineers.

D. SUPPLY.

1. Excess equipment and a large reserve of supplies were necessary because the water supply requirements proved to be much greater than the battalion was originally intended to furnish.

2. Items which were particularly inadequately stocked in depots were 2½" rubber discharge hose, chlorinator parts, pressure gauges, well-screen, well-drilling 2nd and 3rd echelon parts, deep well pump, and spare parts for Waukeshaw and Wisconsin engines. This often caused serious curtailment of operations until requisitions could be filled.

3. Lumber for construction of water towers, especially platform materiel, was often not available to the water supply battalion because the use of such lumber for bridges was given higher priority.

E. NEW DEVELOPMENTS.

1. Suction Chlorinator

Where the water source was clear, proper chlorination was accomplished by the installation in a booster pump suction line of a reverse pitot tube connected to a tank of chlorine solution by a hose and valve.

2. Winterized Water Tank

The canvas tank on a water tower was protected against freezing by constructing a shelter of lumber and roofing paper. Two standard immersion heaters were used to

keep the water above freezing temperature. The inlet and outlet pipes were insulated by enclosing them in wooden boxes filled with straw, paper or burlap.

3. Portable Water Tower

Using standard 2″ pipe and fittings, a portable water tower was constructed using the same basic design as for the timber tower.

4. Water Tank Cover Support

To prevent snow and rainwater from weighing down the canvas water tank cover a support was devised of two lengths of steel tubing forming a cross over the tank, and bent so that the center was 18″ higher than the ends which rested on the perimeter of the tank.

33. Fire Fighting

1. Fire prevention was considered to be the most important aspect of fire fighting; and, where sites for installations and dumps of inflammable materiel were selected without the advice of fire service personnel, the hazards of fire were considerably increased. The importance of burning over projected sites for gasoline and ammunition dumps, in order to destroy all inflammable materiel such as dried grass and brushwood, was strongly emphasized.

2. Frequent inspections of installations were made by personnel of the fire service. These proved valuable in making members of the installations more conscious of fire hazards. Recommendations made after such inspections resulted in a further reduction of fire risks.

3. With regard to the siting of chemical extinguishers and the numbers required at dumps and installations, it was found impossible to lay down rigid rules. Such sites had to be visited by fire service personnel and such elements as proximity of water supply, proximity of fire fighting units, and distances between stacks of materiel carefully assessed before an accurate estimate could be formed of the amount of fire fighting equipment required.

4. The American fire fighting units were equipped to enable them to commence work very quickly but lacked sufficient mobile water tanks to combat large fires. It was found that a minimum of two trucks (total 600 gallons) should be dispatched to every fire, and when more water was necessary the water supply battalions had to be called upon to provide tankers. This later became SOP so that the nearest water supply unit received a fire call at the same time as the nearest fire fighting unit.

The British units were without mobile water tanks and depended upon the availability of local water or static water tanks, which were always erected at installations which had no local water and where considerable fire risk existed. Their pumping equipment was more powerful than the American, but due to the necessity of using static water took longer to get into action. The British foam producing plant also depended upon the use of static water, but was capable of producing larger quantities of foams than the American. It was found therefore that the American equipment with its speed of getting into action, and the British equipment with its more powerful pumps and its capability of longer sustained action, formed an excellent combination at any fire. Both types of equipment were dispatched to all large fires when practicable.

5. Gasoline dumps presented no special difficulties. Here again the carrying out of adequate fire precautions beforehand, including the rejection of all leaking cans, the cutting of grass between stacks, and the prevention of all means of ignition were all important. In the actual fighting of gasoline fires it was found that a foam cover of 4-8 inches over the whole area of the fire was necessary to extinguish it.

6. Certain characteristics were discovered about burning ammunition.

a. When water was put on a slag of burning ammunition an explosion resulted. Although this had not the intensity of a normal shell explosion, it was still dangerous.

b. It took about ten to fifteen minutes after a fire had started for the temperature to become sufficiently high to explode the shells in that stack.

7. Tank dozers were of great value in fighting ammunition fires. They were used initially to shield firemen from flying splinters, but it was found that they could be used to greater advantage in smothering the fire with earth. Firemen played water on the idler wheels of the tank to prevent them from burning, and on the tank itself to keep it cool.

8. Where tank dozers were not available ordinary tanks or half-tracks were used successfully to enable firemen to approach the fire close enough to make water streams effective.

9. Bulldozers were invaluable for moving large quantities of materiel, where this was necessary to get at the heart of the fire. This was especially true at fires involving coal or straw.

10. The original two wheel drive trucks issued to American units were found to be incapable of negotiating muddy and icy roads, and had to be exchanged for four wheel drive trucks.

11. Precautions had to be taken in cold weather to prevent the freezing of the lines and pumps. On the return journey from a fire they often froze and had to be thawed out immediately on return. Trucks were kept in heated garages during cold weather.

Chapter Eight

SUPPLY

SUPPLY

1. Supply Administrative and Evacuation (SAE) Instructions

The publishing of consecutive Army Administrative Instructions in a numbered series, referring to and/or rescinding previous related or conflicting instructions, was discontinued after one year of active operations in the Italian theater. It became increasingly difficult to locate and piece together a complete picture of current policy on any one subject, since policies for many services and on many subjects were in each of the numerous Administrative Instructions.

Through the combined efforts of the Army G-4 Section and the Army AG Section there was devised the Army "SAE Instructions" publication. Fifth Army Supply, Administration and Evacuation instructions were kept in "looseleaf" form, so that individual sheets could be added, or substituted for old sheets. Besides reducing the size by over fifty per cent, this publication had other inherent advantages over the system of publishing consecutive Administrative Instructions in a numbered series:

a. Policies on each subject were complete in one place.

b. Rescinded policy did not accumulate.

c. Permanent cross indexing could be made, as each subject was assigned a permanent section number.

d. "Posting" of revised and rescinded instructions was unnecessary.

e. The assignment of permanent section numbers to each subject permitted indexing.

2. Average Daily Consumption of Supplies. Anzio Beachhead

The average daily consumption of supplies by U.S. Forces, Anzio Beachhead is given below, computed on the basis of the supplies required by an average strength of 85,000 over the representative period of 1 to 15 February, 1944. During this period the situation was relatively static, combat was defensive with occasional sorties and counter-attacks, and the enemy air force was very active.

Pounds per man per day:

	CWS	ENGR	MED	ORD	QM	SIG	TOTAL	%
Cl I					6.26		6.26	15.8
II & IV	0.027	0.80(b)	0.11	1.33(a)	.85	0.003	3.120	7.6
III					3.56(c)		3.56	9.0
V	0.80	0.03		25.80			26.63	67.3
Total	0.827	0.83	0.11	27.13	10.67	0.003	39.570	100.0
%	2.1	2.1	.3	68.5	27.0		100.0	100.0

(a) Includes Major Items replacements.

(b) Principally fortification materiels, wire, sandbags and lumber.

(c) Based on strength of 110,000 (Br and U.S.)

The above series of figures, added to similar figures for British troops in the Beachhead, indicates the tremendous problem that was overcome to provide daily maintenance alone, which, when added to build up requirements, dictated that at least 2500 tons be off-loaded daily.

3. Supply over Beaches in a Landing Against Opposition

1. General

Task force commanders were responsible, through assigned beach groups, for receiving and stocking supplies at the beaches, and, through organic service units for issuing them to the combat elements. Task forces at Salerno were prepared to be supplied over the beaches up to and including the ''D plus 12'' convoy. After the passage inland of the assault troops, control of the beaches passed to the beach group commanders. Then, as soon as the tactical situation allowed, Army assumed complete control. When this occurred, a transportation section which Fifth Army had previously constituted and organized as a Special Staff Section, began operating under control of G-4. This new section was charged with the unloading of· all ships and crafts, the establishing and operating of rail facilities, and with the control of all Army truck transportation. From the beach forward, supply was accomplished by Divisions, Corps, and Army in their respective zones of action, while resupply, a function of Army, was handled by drawing from North Africa or directly from the Zone of Interior. To expedite resupply, an Army Base Area section was formed to control and operate ports, rail transportation, base depots, fixed bed hospitals, and other base area installations.

2. Beach Organization

a. *Beaches* - Chart I shows the beaches used in the initial landing at Salerno which was made against considerable opposition. The general layout and organization is shown on the chart. Two additional beaches were used after the beachhead was firmly secured.

b. *Beach Control* - The Navy beachmaster controlled all operational landings and maintained communications between ships and shore. A port headquarters, which operated

THE PAESTUM BEACHES
9 SEPTEMBER 1943

••••• BEACHES AS PLANNED
———— BEACHES AS ESTABLISHED
—•—•— EXIT ROADS FROM THE BEACHES
——— WALL OF PAESTUM

SUPPLY POINTS:

ORDNANCE	CLASS III SUPPLIES	MEDICAL CORPS
AMMUNITION	ENGINEER	WATER
CLASS I SUPPLIES	SIGNAL CORPS	MISCELLANEOUS
CHEMICAL WARFARE SERVICE		

0   500   1000 YARDS

CHART 1

348
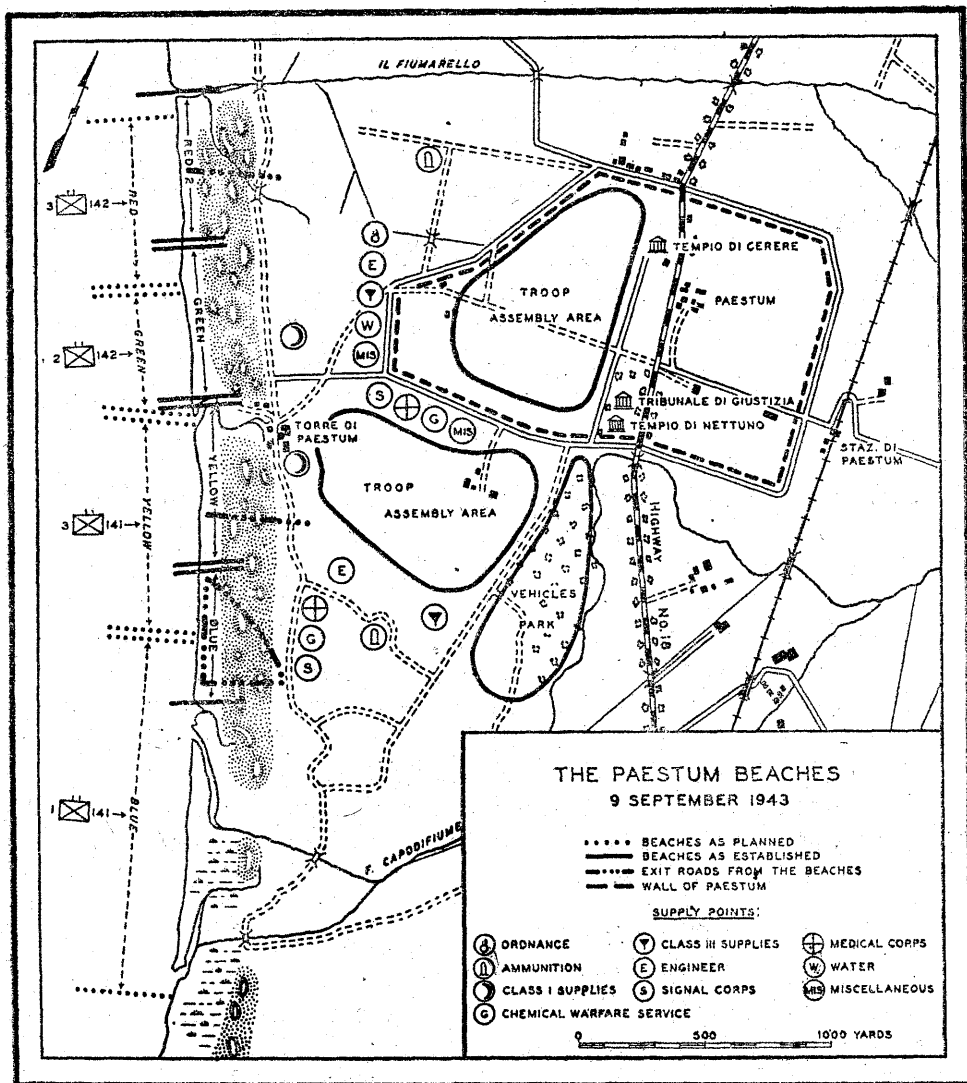
BEACH SAND AREA.

SUMMERFELD TRACK ROAD.

LCM'S AND LCT'S

LST

RAMP

DUKW'S

SHORE LINE

SAND ROAD FOR TRACK VEHICLES

CP ENGINEER SHORE BN & NAVY BEACH MASTER CHECKER

TRACK VEHICLES

DEWATER PROOFING AREA

2 WAY ROAD TO DUMPS.

IN

OUT

OUT

SUPPLY

CHART II, TYPICAL LANDING BEACH FOR THE SUPPLY OF ONE COMBAT TEAM.

two port battalions, controlled and coordinated all ship unloadings, while the engineer shore regiments were the pivots around which all supply operations revolved. Two of these regiments operated all the beaches and unloaded craft at the beaches.

  c. *Organization* - Chart II shows the organization of a typical landing beach for the supply of one combat team. The LCT's and the LCM's unloaded on the beaches, while the LST's discharged their cargoes on a floating dock connected by a ramp to the beaches. DUKW's which operated from ship to shore carried supplies direct to the dumps established inland. Sommerfeld track was laid generally as shown to provide footing.

  d. *Reports from Beaches* - Information on the beach operations was submitted daily by Corps to Army through the medium of daily sitreps. These reports covered the ship and craft unloading, tonnage, casualties, prisoners of war, personnel disembarked, and events of administrative interest.

3. Operation :—

  a. *Installations* - Initially, all administrative installations on the beaches, including dumps and clearing stations, were controlled and operated by the beach groups. Installations forward of the beaches were under the control of Combat Teams, Divisions, Corps and later Army.

  b. *Communications.*

  (1) *Water* - The Navy operated all shipping. The convoys carrying the assault units and maintenance supplies from North Africa arrived at the designated beachhead on a definite schedule. Initial and first follow-up convoys of U.S. troops were combat loaded, while subsequent convoys were "ship to shore" loaded. Convoys for continued maintenance supplies arrived at objective from both North Africa and the Zone of Interior.

  (2) *Roads* - Task Force commanders in their respective zones of action designated main supply routes,

established priorities, restrictions, and traffic control. Roads from the beaches were constructed and maintained.

(3) *Rail* - An attempt was made to utilize rail transportation during the initial phase of the operation, and every effort was made to prevent destruction to existing lines and rolling stock.

(4) *Ports* - The use of ports was included in the original plan, but the main port was not captured on schedule. Construction equipment and troops to rehabilitate this main port were kept immediately available on call.

(5) *Air* - The plan did not contemplate supply by Air Transport in the initial landing except for airborne elements. Airfields were immediately constructed on the beachhead.

c. *Supply* - Supply was organized so that the initial assault convoy carried:

(1) Seven days Class I supply for all U.S. troops, including one gallon of water per man per day for all purposes for four days.

(2) Class II assault packs for individual equipment (QM, Ord, Med, CWS) at 5% of the assault strength. These were additional supplies based on 5% of the assault force. Ordnance spare parts were carried by units. All other service supplies were provided at a seven day combat maintenance level.

(3) Enough Class III fuel and oil for seven days, based on a 50 mile operational day for all vehicles of the Task Force and Airforce ground vehicles.

(4) Enough Class IV engineer construction materials for initial construction and maintenance of beach roads, and landing field development.

(5) 2-1/3 units of fire of Class V supplies.

Follow-up convoys provided normal combat maintenance supplies. Airforce technical supplies were provided through airforce supply channels. Supplies common to both airforce and Army, such as rations and vehicle fuel, were supplied to the airforce by the Army.

351

d. *Evacuation* - Initial evacuation of casualties was accomplished both by air and water, depending on the availability of each class of transportation. Adequate hospitalization was established on the objective as soon as possible.

Burial was by unit assisted by the available Graves Registration personnel.

Prisoners of war. were initially evacuated to beaches by units, then to North Africa by returning transport.

Evacuation of salvage and captured enemy materiel was a unit responsibility. Evacuation to beach or to railhead, truckhead or base area was accomplished by using returning supply transportation; and from the objective to North Africa or the Zone of Interior by returning ships.

4. Stacking of Combustible Commodities in Depots Subject to Enemy Fire or Bombing

Based on experiments and operations at Anzio, the following procedure was adopted in an effort to further conserve combustible stocks during the heavy shelling and bombing encountered in this operation.

Each stack of ammunition and gasoline was stacked compactly, and then banked with dirt by a bulldozer to the height of the stack. Then if the stack was fired it burned slowly, since the supply of oxygen was cut off except from the top surface of the stack. By shovelling dirt over the rest of the stack the fire was promptly smothered in a short period of time, and with a minimum of loss.

5. Control of Excess Equipment

The first step that was taken to control the issue of equipment in excess of T/E was the publication, in Administrative Instructions, of information concerning the principles governing such issues and the procedures for obtaining them. The

purpose of this was to establish a preliminary screen to filter out requests for excess equipment arising from fancied or unimportant needs. It was intended that each succeeding headquarters evaluate requests in the light of operational necessity and make appropriate recommendations.

When requests reached the Army G-4 Section they were fully investigated and given a final evaluation. In urgent cases, when issue could not await approval from higher headquarters, a special authorization memorandum was published by Army Headquarters permitting immediate issue for a limited period. When excess issues were approved by MTOUSA or the War Department, equipment augmentation letters were published to the troops concerned.

A "tickler" file was maintained in the G-4 Section to assure the return of such excess equipment to Army stock automatically on or before the expiration date. This file provided a four-way cross reference so that a clerk could check the status of all excess equipment due to be returned to stock on any particular day. Thus the failure of any unit to return equipment when due was known immediately. Such units were notified by form letter of their delinquency and were given ten days in which to comply. If they persisted in their delinquency a second letter of a command nature was sent through command channels.

Units turning in equipment were required to send true copies of the tally-in or shipping ticket to the G-4 Section in order to enable that Section to clear its file.

When the need for excess equipment continued beyond the expiration date of the original authority, requests for extensions were made in the same manner as the original requests.

6. Reorganization of Units in a Combat Zone

From the supply viewpoint, the reorganization of any unit in a combat zone was no major problem provided the equip-

ment authorized on the new T/O & E was available. Too often, however, units were ordered to reorganize before the supplies to accomplish the reorganization were available. When such was the case, substitutions were necessary until such time as the new equipment became available. Units as large as a regiment were reorganized without drawing the unit out of the line, but more often reorganization was best accomplished when the unit was back for rest and rehabilitation.

7. Utilization of Local Resources in a Foreign Country

In order to decrease requirements for shipping materiels and equipment from the U.S., considerable use was made by the Army of civilian resources. Supplies from local sources were used, critical items and maintenance parts were manufactured in local shops, and industrial gas and cement requirements were met by operation of local plants. In some cases the actual welfare of the troops was directly dependent upon the availability of certain resources, such as coal, fire wood, and cold storage and dry cleaning plants.

The extensive exploitation of local resources in a foreign country had to be carefully controlled. This control was exercised by the Army G-4 Section in connection with Allied Military Government by issuing "blocking orders" for certain resources as needed by AMG for civilian use, and by Army for military use. Unfortunately, neither G-4 Section nor AMG had a sufficient number of trained personnel to control completely local resources. Often urgently needed materials were not declared on inventories and sufficient police personnel was not always available to prevent some loss of critical materiels to Black Market organizations.

8. Real Estate Problems

After almost a year's experience it was found most efficient to centralize responsibility for all real estate activities in territory occupied by Army. To deal with these matters, a separate

354

Real Estate Division was established in the Army Engineer Section. The Army Engineer was responsible for all real estate activities in the Army Area, but delegated it to subordinate corps within their boundaries. On its release by the Army Commander, Base Section assumed control of real estate for which Army had no further use.

Before Real Estate planning was inaugurated, units moved up independently and reconnoitered rapidly for a bivouac without any thought as to where closely related services might be located. Consequently, many small organizations occupied areas which were ideal for hospitals or depots. Each unit merely located itself and reported the fact to G-4. Consequently, bivouacs frequently had to be rearranged and units moved to new locations, resulting in delay and confusion. It was soon learned that each advance by Army demanded careful planning prior to actual occupation so that general locations for each of the vital supply services could be determined well in advance. This was done initially with the aid of air photographs and maps. As soon as the tactical situation permitted, ground reconnaissance was made.

Agencies interested in locations in new areas presented their requirements to the Real Estate Officer well in advance. If they failed to do so, they were nevertheless assumed to require accommodations, and installations for them were included in the development plan submitted to G-4. Each unit was notified and in most cases approved the arrangement, and later used the accommodation. This service was also rendered to units outside the Army.

Requests that areas be reserved well in advance of actual occupancy were received from time to time. These were generally for airfields, gasoline storage dumps, rest camps, and staging areas. When such requests were approved, care was exercised to keep the area reserved until the applicant was ready to use it. This necessited a "future" file and map indications. Very often units from higher echelons were interested in a piece of property occupied by Army elements and requested that the property be turned over to them when released. Such

requests were forwarded to the proper allocating agency of the relieving Base Section.

The Real Estate Officer moved to a central location in a new development area in advance of the service elements. His office was set up with the necessary maps, plans, records, etc. The operation of getting elements into the area then commenced. Each of the services sent a representative to the Real Estate Office to obtain final information and formal allocation and requisition papers. As a rule, an average of approximately 250 to 300 individual requests were handled. They were reviewed in the light of the overall plan and their most effective location from an operational standpoint.

All requests for odd lots or buildings were processed individually. After the location was approved it was registered and formal requisition papers were issued in quadruplicate. When the necessary information was filled in, the papers were returned to the Real Estate Office for final approval, signature, and seal. Occupant's copy, property owner's copy, and building registration card were handed back to the person desiring accommodations. He was then ready to occupy, merely posting the card on the premises and giving the property owner his copy of the requisition for presentation to the Italian Claims Department.

Cancellation of an approved requisition was sometimes necessary. Occasionally there was a necessity for removing one type of service to accommodate a higher priority unit, such as a hospital.

Evictions usually occurred when a unit occupied premises without proper authorization. The Real Estate Officer relied upon the Provost Marshal and the Corps of Military Police for checking unauthorized occupancies. The Provost Marshal in many cases was given valuable assistance by reserve combat units used as special Police and by civilian police under AMG control. Every 24 hours the local Provost Marshal was furnished with a list of allocations for checking purposes. The Military Police were able to identify authorized occupancies by a numbered card bearing the official Engineer Seal. If the unit

occupying the premises displayed no card, it was given two hours' notice. and then evicted.

When Army moved on and Base Section took over, there was a period of closing out. Army elements proceeded to dispose of holdings, and each of the former occupants began to send their processed requisitions in to the Real Estate Office. These were then gathered in groups, re-checked, forwarding papers attached, and the forms sent through the proper channels to the Italian Engineer Board for adjustment of claims. Outstanding requisitions for property to remain occupied by Army units in the Base Section were turned over to Base with the understanding that Army units would not be disturbed until operations compelled them to move.

9. Problems Concerning the Requisitioning of Facilities and Payment for Local Supplies and Services

Requisitioning of civilian facilities was necessary in many instances:

a. To supply units actively engaged in combat.

b. To supply units requiring gravel, sand, cement, building blocks, steel trusses, road graders, rollers and other items used for building, rebuilding, and repairing roads, bridges, airfields and public utilities.

c. To provide real estate for military purposes.

d. To obtain machinery and equipment for use in workshops, factories, etc., taken over and operated by the military.

e. To supply gas, water, electricity, and telegraph and telephone services.

For c and d above, reimbursement was made by the Italian Government based on information contained in the real estate forms processed on the property. For e above, reimbursement was made by the Italian Government through the Allied Com-

mission, and private firms presented their requests for payment to that organization. Civilian facilities we required were requisitioned with or without the consent of the owners, and without regard to their presence or absence.

All classes of supply and labor were purchased by agent finance officers. As there were no authorized limited depositories, disbursing officers were unable to carry bank balances and pay obligations by check, and a general policy of cash payment for civilian labour and local supplies was followed. Agent finance officers made such payments from appropiate funds previously allocated by Army. Where the agent was unable to arrive at fair prices, the local Army AMG was asked to suggest a price scale to be used as a guide in order to avoid inflation caused by over payment.

10. Supply Problems in Connection with Employment of Italian Troops

The utilization in Fifth Army of the Italian Armed Forces who were converted from an enemy to a co-belligerent status immediately presented difficult problems of logistics. It was found impossible to maintain combat elements adequately with Italian equipment. It was unsatisfactory to scour captured dumps for ammunition for Italian weapons. Maintenance and replacement were either non-existent or unsatisfactory. Service troops, however, were used by the U.S. Fifth Army forces. Some Italian combat elements were equipped and maintained by the British Forces in Italy.

Fifth Army was responsible for the supply, maintenance and evacuation of almost all Italian Armed Forces operating under its command or with it in the Army Area. A few units were supplied their individual clothing and equipment, organizational equipment, and medical supplies by the Italian War Ministry. These were guard and hospital units and represented only a small percentage of the total Italian Military troops with the U.S. forces in Fifth Army.

The War Department authorized the loan of certain U.S. items to Italian units. Other necessary items were to be obtained by the Italian War Ministry from military stocks recovered in the liberated areas.

The War Department authorized the issue of dyed (dark green) Class "X" clothing (beyond economical repair for use by U.S. troops). This clothing was distributed through Army Quartermaster installations, which also maintained a 30-day reserve level.

Details of ration components were established in which certain items were to be supplied from U.S. sources and certain others from local sources. Many difficulties were encountered in procuring the Italian items and when these items were unavailable the ration proved insufficient.

The utilization of Italian Military Troops was not entirely efficient because of the difficulties encountered in the supply and maintenance of these troops.

11. Supply Problems in Connection with Employment of U.S. Equipped Foreign Troops

U.S. equipped foreign troops (French and Brazilian) were concerned with certain items of supply peculiar to their nationality. These items fell within Quartermaster Class I, II, and IV supplies. The French used about 50% U.S. rations, and the remainder, which consisted largely of wine, brandy, fish and flour, was supplied through their own sources. The French requirements for Quartermaster Class II and IV supplies were supplied almost 100% from U.S. sources. The Brazilians used about 90% U.S. rations with a few additions such as rice, beans, and coffee from their own sources. Brazilian requirements for Quartermaster Class II and IV supplies were supplied approximately 50% from U.S. sources and the remainder from their own sources.

Both the French and the Brazilian Expeditionary Force established Base depots to handle those items which they

supplied from their own sources, but neither ran separate truckheads in Army area. Detachments were furnished to U.S. truckheads from both forces to handle the special items as well as the U.S. supplies required to service their own troops.

12.   Organization for Supplies in an Army Composed of Allied Troops

The supply system of the British Army and its Dominion Armies was entirely different from that of the United States Army. Therefore, when an army was composed of Allied troops separate organizations for supply were maintained for both British and U.S. troops. The British made available to the Fifth army a "vertical slice" of their organization. This was known as the British Increment and close liaison was maintained between the two supply headquarters.

When Allied troops were U.S. equipped, and trained in U.S. supply procedures, as was the case with the French and the Brazilian Expeditionary Force, few difficulties were encountered by U.S. supply agencies in maintaining these troops in combat. There was always a small language diffculty but this was no major problem from the supply view point, due to the fact that English-speaking liaison officers were provided. Special items peculiar to both the French and the Brazilians were supplied through their own supply system which functioned similar to the U.S. system. Some difficulties were encountered with separate "Base" dumps, particularly with lease-lend accounting and maldistribution of items of short supply, but these were worked out satisfactorily.

Chapter Nine

ORDNANCE

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1. Army Ordnance Organization

Combat Zone Experience of Fifth Army Ordnance service established the sound principle that when an Army operates on a continuous front, all Army non-divisional Ordnance units should be assigned to an Army Ordnance Command Headquarters and organized vertically under three (3) field commands: one field headquarters to operate all third echelon Ordnance service; another fourth echelon Ordnance service, Class II and IV supply, and evacuation; and a third to provide ammunition service. (See Chart 1). This organization was made sufficiently flexible to operate on a horizontal basis during the initial phase of an independent division or separate corps operation.

In accordance with established procedures, this Army Ordnance organization supported corps and division Ordnance organizations. Details of the organizations, policies and procedures used to provide Army Ordnance services are presented in subsequent articles.

2. Army Ordnance Command Headquarters

Experience has proven that when the Army Ordnance section is employed in a dual capacity (as contemplated in par. 62 of FM 9-5) as a special staff section of Army headquarters, with its activities coordinated with those of all other Army staff sections, and as the Army Ordnance command headquarters charged fully with the responsibility of furnishing combat zone Ordnance service, it is a most valuable asset to the Army Commander, particularly in a fast moving situation. The responsibility of planning for Ordnance service within the Army, for placing the "Ordnance Plan" in operation, and for maintaining close liaison with the Theater Ordnance officer and the Base section, was within the scope of this coordinated dual-capacity Army Ordnance section and command headquarters.

HEADQUARTERS
ORDNANCE GROUP
COMMAND HEADQUARTERS
FIFTH ARMY ORDNANCE SERVICE

EXECUTIVE SECTION

MAINTENANCE AND SUPPLY SECTION

ADMINISTRATION-PERSONNEL AND PROCUREMENT SECTION

AMMUNITION AND BOMB DISPOSAL SECTION

OPERATION SECTION

MESSAGE CENTER MAIL AND RECORDS

HQ & HQ DET ORDNANCE BN or GP

HQ & HQ DET ORDNANCE GROUP

HQ & HQ DET ORDNANCE GROUP

● Assignment Army Class V Supplies
●● Assignment Army 3rd Echelon Maint. & Supply.
●●● Assignment Army 4th Echelon, Supply Evacuation & Salvage.

CHART I.
ARMY ORDNANCE ORGANIZATION

To facilitate this, there were normally two CP's: one with the Army forward CP; one with Army rear CP. The forward CP maintained close liaison with the Army Commander and the tactical staff sections, in order to provide effective Ordnance service for current operations and to plan for future operations. The rear CP coordinated and supervised administration, ammunition, operations, and maintenance and supply functions.

a. *Administration Section:*—All Army Ordnance administrative, personnel and procurement activities were coordinated and supervised by this Army Ordnance command headquarters. Authority for the transfer of enlisted men was delegated to the subordinate group headquarters but the authority for transferring officer personnel was retained. Local procurement activities and civilian labor pay and control which were supervised by this section, are described under "Utilization of Local Resources", paragraph 19.

b. *Operations Section:*—The general operating policy was to delegate Ordnance service responsibility to the lowest echelon possible, thereby achieving decentralization and establishing control in a unit which was completely familiar with details of the service it was providing. In this way duplication of effort and the pyramiding of controlling agencies was practically eliminated.

This section coodinated and supervised Army Ordnance operations. It published a daily Ordnance operations bulletin which furnished information on the tactical situation, the status of the ability of Army Ordnance service to sustain it, and Ordnance technical information to Army Ordnance field commanders, and staff officers in supporting echelons, including the Chief of Ordnance.

c. *Maintenance and Supply Section:*—This section coordinated and supervised Army Ordnance maintenance and supply responsibilities in close conjunction with the other Army staff sections, particularly the Army G-4 section. All combat and general purpose vehicle allocations were issued by Army G-4 through this section, while all armament allocations were directly allocated by this section. Stock records on controlled

major items were maintained. Coordination of Army supply activities with the theater Ordnance section and the Base section were also accomplished by this section. As a part of the special army staff this section acted in an advisory capacity to the Army G-4 section, determined the availability of supplies, expedited their delivery to Army and initiated investigations of proposed field expedients which would improve the field use of Ordnance equipment.

d. *Ammunition and Bomb Disposal Section:*— Working in conjunction with Army G-4 who allocated all controlled ammunition, this section controlled and coordinated all ammunition and bomb disposal activities. In addition, technical information was supplied to all echelons, special items of ammunition were obtained, and Army ammunition status reports prepared.

3. Third Echelon (Non-Divisional) Ordnance Field Headquarters

Since there was no official agency existing at the beginning of the Italian Campaign to coordinate the efforts of the third echelon Ordnance battalions in the field, a provisional battalion was formed as the forerunner of a third echelon Ordnance group headquarters. Many of the practices and controls of the provisional battalion were eliminated as a result of experience, and the following functions were found the most suitable for delegation to the group commander by the Army Ordnance commander.

a. *Administrative Section:*—Since there was no administrative section authorized by T/O, it was necessary to form an administrative section similar to that of an infantry regimental headquarters.

b. *Operations Section:*—This section was responsible for providing third echelon Ordnance support to all Army, corps, and division troops. Thus, to provide this, one Ordnance

battalion supported Army transportation, service units and separate Armored units, and one battalion supported each corps. The assignment of companies to these battalions was made by this section under direction of the third echelon Ordnance group commander. A tactical situation map showing the locations of all Ordnance installations was maintained, as was a card file on all units given third echelon service. This section published a daily·bulletin giving the latest locations of third echelon Ordnance units and changes in Ordnance service responsibilities, in addition to a weekly troop list. Close coordination between this section and the maintenance and supply sections was absolutely necessary to insure uninterrupted Ordnance service.

c. *Maintenance Section*:—The primary aim of this section was to cope with maintenance problems arising in the field, and to attempt to foresee maintenance difficulties sufficiently in advance to make plans for avoiding them. In order to keep all echelons informed of the condition of serviceable Ordnance equipment in the field, Ordnance specialists were assigned to this section to maintain close touch with all Ordnance equipment in the field. This section distributed, for the benefit of all concerned, worthwhile modifications or improvements which were made on Ordnance equipment in the field.

d. *Supply Section*:—This section coordinated and supervised the supply responsibility of third echelon Ordnance battalions and their companies. It served also as a means of liaison between third echelon units and the fourth echelon group in matters regarding major items, Ordnance supplies, and the manufacture of certain unavailable items. In addition, this section assisted the battalions in every possible manner to secure critical spare parts; it furnished the maintenance and operations section of the group with general information on supply matters for planning purposes; and when necessary it controlled the distribution of certain critical supplies.

4. Fourth Echelon Ordnance Maintenance, Supply and Evacuation Field Headquarters

An Ordnance fourth echelon group headquarters was assigned to coordinate and control fourth echelon maintenance, supply and evacuation. Normally three battalions were assigned to this field headquarters; one battalion controlled and operated ordnance Class J and IV supply activities, another operated evacuation and reclamation, while the third coordinated and controlled fourth echelon maintenance.

a. *Administrative Section*:—This section was similar to that of an Infantry regimental headquarters.

b. *Operations Section*:—This section was the coordinating and controlling agency of this headquarters. The employment of evacuation companies to move armored units and to evacuate battle casualties and salvage was one of the particular functions of this section. Salvage operations were coordinated with supply needs and arrangements to investigate field expedients were made by this section.

c. *Maintenance Section*:—The maintenance section set and supervised maintenance standards, analyzed special maintenance problems, established production schedules and coordinated maintenance activities between third and fourth echelon, and Army.

d. *Supply Section*:—This section regulated the flow of major items, maintained stock control of such items, and issued them on allocations of Army G-4, as transmitted to the group commander by the Army Ordnance Commander. The allocation system, which was organized so that the time that elapsed from the loss of the old item to receipt of the new item was less than 24 hours, was effectively operated as directed by the Army Ordnance commander in full coordination with Army G-4. Major item requisitions on the Base section were prepared and all supply activities between the

368

depots and Army were coordinated by this section. Supervision of "Deadline Requisitions" procedures and all depot operations was also effected.

5. Ammunition Service Field Headquarters

This field headquarters had the responsibility of providing ammunition service. It varied in size from a group headquarters with two battalions to one battalion with five companies. In addition, eleven (11) bomb disposal detachments were attached. The main functions of this field headquarters were:

a. *Administrative Section*:—This section had the normal administrative duties of a battalion or group headquarters.

b. *Operations Section*:—This section ordered all ammunition resupply, supervised stockage levels, conducted reconnaissance for new ASP's, erected and maintained direction signs for all ASP's, consolidated daily ammunition status reports, and issued ammunition on Army allocation for controlled ammunition or on certificates of expenditures for uncontrolled ammunition as directed by Army Ordnance commander.

c. *Maintenance Section*—A Technical Service section, which was used in lieu of an ammunition renovation company, modified ammunition, changed fuzes, and renovated ammunition when necessary.

d. *Supply Section*:—The supply section had the normal supply functions of a battalion or group headquarters.

6. Providing Ordnance Service to Using Units

Third echelon Ordnance units had the responsibility of providing complete, continuous, and automatic Ordnance service directly to the using unit, except in the case of the Infantry division where support was given through the Ordnance (LM) company.

1. Task Assignments

In order to provide this service, every unit in the Army was serviced by a designated Ordnance company. Changes in these assignments for Ordnance service were kept to a minimum since it was proved that confidence in Ordnance service was more easily maintained in this way. In as far as the tactical situation permitted, permanent task assignments were made, normally as follows:

a. *Battalions*:—One ordnance battalion supported each corps and one Ordnance battalion supported Army Transportation, service units and separate armored units.

b. *Companies*:—One Ordnance (MM) company provided support for each Ordnance (LM) company of an Infantry division and other separate units which operated in the vicinity. One Ordnance (MM) company supported corps artillery units and other nearby units. Because of the shortage of maintenance companies, and the different amounts of Artillery in the two corps serviced during the latter part of the campaign, one Ordnance (MM) company provided Artillery maintenance support for the corps having the greatest amount of Artillery, while the Artillery maintenance support for the other corps had to be provided by Ordnance maintenance units which already had other primary missions assigned to them. Since very few AAA units were employed in the later phases of the campaign only one Ordnance (AAA) maintenance company was necessary. Shortage of Ordnance (MAM) companies made it necessary for them to support as many as 2000 vehicles each, with one Ordnance (MAM) company operating a rehabilitation center. Separate Armored units were supported by the one available third echelon Ordnance (MM) tank company. This company was assigned to support the corps which had the largest number of these units, while the separate Armored units in the other corps were supported by the Ordnance (MM) companies which had other primary missions.

2. Ordnance Contact Parties in the Combat Zone

Ordnance contact parties as described in FM 9-10

were modified and were used primarily as a method of maintaining liaison between the supported Ordnance company and the using units.

Since the beginning of the Italian Campaign the sending of daily Ordnance contact parties to the using units was standard procedure. At first, these contact parties consisted of small groups of Ordnance technical specialists, sent out by the supporting Ordnance company to visit each assigned unit daily. Their purpose was to provide technical advice and to give all possible assistance in the inspection, repair and replacement of all items of Ordnance equipment. This system of sending trained Ordnance specialists out to "ride the roads" all day without the time or facilities to handle any reasonably large jobs encountered, proved to be a waste of skilled manpower, and the composition of the contact party was gradually changed until it consisted primarily of liaison men allowing the trained men to work in the shops all day, except when sent out for a special mission coordinated by the contact party.

The contact party's mission was to contact the divisional light maintenance companies, the service batteries, the maintenance sections, motor pools, and the unit S-4 sections where they received all requests for Ordnance service for each unit supported. Each company reported these contacts daily to their Ordnance battalion headquarters giving location of the using unit, signature of person contacted, and information received or work performed. In order to insure efficient handling of the "Contact System", Ordnance battalion and company-commanders made periodic calls on the officers responsible for Ordnance service in the units being supported.

This system proved itself very satisfactory not only as a means of giving uninterrupted ordnance service to the using unit, but as an effective means of notifying all echelons of the exact locations of all units serviced.

3. Changes in Ordnance Support of a Using Unit

Due to the constantly changing situation, Ordnance units found that the list of units, for whose maintenance

and supply they were responsible, changed frequently. Although task assignments for large tactical units generally remained permanent, a number of smaller combat and service units had to be supported by a succession of Ordnance units. In order to provide uninterrupted Ordnance service for these supported units it was necessary to establish an efficient flexible system of transferring the maintenance and supply responsibility from one Ordnance unit to another. This was done by requiring each Ordnance maintenance company supporting a combat or service unit to maintain records of the status of the Ordnance support of that unit. When the support of that unit was transferred to another Ordnance company these records as well as peculiar Ordnance Class II supplies were passed promptly from the old Ordnance company to the new supporting Ordnance company.

This system, known as the "Envelope System" operated as follows:

a. *Action by Old Supporting Ordnance Company*:— To accomplish this transfer, the old Ordnance company was required to prepare and forward within 24 hours, to the next higher Ordnance headquarters an "Ordnance Status Report" envelope or folder. This was delivered through Ordnance channels to the new Ordnance supporting company and contained the following:

(1) A letter of transmittal with pertinent information as to official designation of unit, T/O & E, location, commanding officer's name, motor officer's and motor sergeant's name, supply officer's name, name of person usually contacted, date unit was last contacted and last inspected, and any remarks regarding maintenance and supply problems peculiar to this unit.

(2) The latest "Ordnance Materiel in Hands of Troops Report" with any permanent changes thereto together with a list of Ordnance materiel authorized in excess of T/O & E.

(3) A "Status of Allocations of Major Items".

(4) An "Ordnance Status of Modification Work Order Report".

(5) An "Ordnance Artillery Report". (See "Balanced Artillery Firepower", paragraph 15).

(6) An "Ordnance Status of Work Orders Report" indicating amount and disposition of work remaining in the shop.

(7) A "Consolidation of Unfilled Requisitions Report". (A copy of this report was also forwarded to the supporting Ordnance depot company in duplicate. These items and quantities which were not desired or which, if received, resulted in an overage in the reporting company were especially noted with the request that they be cancelled from the depot dues-out to the reporting company. Items and quantities not so noted were not cancelled and remained due-in to the reporting company. The depot then returned one copy of the "Consolidation of Unfilled Requisition Report" to the reporting company, showing action taken).

b. *Action by New Supporting Ordnance Company*:— The new Ordnance company upon receipt of this "Ordnance Status Report" reviewed the dues-out with the supply officer of the using unit for cancellation of supplies no longer required or for additional supplies which were then immediately requisitioned.

c. *Action by Ordnance Group and Battalion Headquarters*: — Group and battalion commanders continuously checked to insure that the principles and details of the envelope system were carried out.

This system, which allowed Ordnance units to be cognizant of their maintenance and supply responsibilities and facilitated the transfer of these responsibilities, maintained the using units' confidence in Ordnance service.

7. Third Echelon Maintenance Procedures

Ordnance units which operated in the combat zone found that a very large percentage of the work done for combat troops

must be carried out during the rest periods for those units. Whenever a combat unit was withdrawn from the line and sent to a rear area for a period of time, the Ordnance equipment of that unit was given full attention by the supporting Ordnance service. This was the only period during which all of the division's equipment was available for inspection, repair, overhaul, etc., and it was placed in the best possible condition for its return to combat where Ordnance attention was necessarily limited for an indefinite period of time. During this short rest period, usually ten to thirty days, a program of Ordnance rehabilitation was pressed.

1. Ordnance Rehabilitation Plan :—

Details of this rehabilitation program are:—

a. *Planning*:—Planning for the necessary crews, control and scheduling of the work was jointly arranged by one officer from the responsible Ordnance (MM) company and one officer from the division Ordnance section. The officer from the Ordnance (MM) company provided a brief plan of the program in order to acquaint the crews with the schedule and the type of equipment involved, and made appropriate requests on higher headquarters for any additional support. The officer representing the division Ordnance officer arranged the work scheduled by alerting the various units on the dates when their equipment became available.

b. *Policies*:—A complete inspection and repair (or replacement) service, using second echelon unit motor maintenance sections in conjunction with light maintenance and medium maintenance companies was provided. The automotive repair work fell to the lowest echelon of maintenance capable of handling it. It was usually possible to obtain the necessary work crews from one Ordnance battalion without seriously affecting its regular operation; however, if two or more divisions were rehabilitated at the same time, additional help was obtained from other third or fourth echelon Ordnance battalions.

c. *Work Crews*:—Rehabilitation work crews

374

accomplished, on the average, the inspection and repair shown in Chart II (These crews worked in the motor pool or bivouac area of the unit being rehabilitated).

d. *Supplies*:—Crews carried spare parts in the anticipated amounts and types consistent with their mission. The supply officer of the responsible Ordnance Company arranged for a depot priority for a reasonable stock of uncontrolled major items and provided for a flow of parts and major items to the work crews and units serviced. Contact men visited each work crew twice daily in order to provide a constant flow of parts. Stock levels of crews working completely independently of their own companies were kept at their original level by the supply section of the responsible maintenance company.

e. *Responsibilities*:—The Ordnance (MM) Company was responsible for the complete Ordnance rehabilitation and submitted a detailed report on the conditions found, certifying that the equipment "is now serviceable for combat."

Chart II REHABILITATION WORK CREW DATA

Rehabilitation of:	INSTRUMENT:			SMALL ARMS:			ARTILLERY:			AUTOMOTIVE:		
	Crew Size	Days	Man Days	Crew Size	Days	Man Days	Crew Size	Days	Man Days	Crew Size	Days	Man Days
Infantry Regiment.												
Average:	5	8	40	4·7	8·8	41·3	4	8	32	20	15	36
Field Artillery Battalions.												
Average:	6·1	4	24·6	4·5	3·2	15·6	5·5	5·8	32	16	10	162
Infantry Division HQs.												
Average.	4·5	·7	3·3	4	·7	2·8	—	—	—	8	10·1	—
Infantry Division Signal Co.												
Average:	5	·7	3·7	4	1	4	—	—	—	8	10	—
Infantry Division QM Co.												
Average:	5	1	5	4	·5	2	—	—	—	20	6	—
Infantry Division Reconnaissance TR.												
Average:	7·5	1·5	10	3	·8	2·1	3·5	1·6	5·5	8	6·2	40
Infantry Division Engineer Bn.												
Average:	5	1·2	6·1	4	2	8	—	—	—	16	13·8	220
Infantry Division Artillery HQs.												
Average:	4	1	4	4	·8	3·3	—	—	—	6	6·5	39
Infantry Division Medical Battalion.												
Average:	—	—	—	—	—	—	—	—	—	10	16	160
Infantry Division Complete.										10	60	
Average:	5	48	240	5	53	212	4	57	230	20	85	2300

These crews were equipped with all tools, special and standard equipment, to completely inspect and repair all equipment for which they were specialized.

2. Ordnance Maintenance of General Purpose Vehicles in the Combat Zone

Ordnance maintenance of general purpose vehicles in the combat zone was provided in three ways:—Continuous maintenance accomplished by supporting Ordnance companies, maintenance provided by an Ordnance rehabilitation center, and periodic maintenance (inspection and repair) accomplished according to a prearranged Ordnance rehabilitation plan when the supported unit came out of combat into a rest period.

a. *Continuous Maintenance by Supporting Ordnance Company*:—In the case of Infantry divisions it was found that under normal operating conditions (when the division was in combat) the supporting light maintenance Ordnance companies normally evacuated three (3) or four (4) vehicles daily to their supporting medium maintenance Ordnance company. Of these vehicles evacuated only one (1) or two (2) were repairable in third echelon and the others had to be evacuated to fourth echelon Ordnance. The remainder of the automotive work of the medium maintenance company came from other corps or Army units assigned to them for Ordnance support. In the case of Army Transportation corps units, Ordnance (MAM) companies provided adequate support.

b. *Ordnance Rehabilitation Plan*:—Since all of the Infantry divisions normally only became available during rest periods, the complete Ordnance rehabilitation plan, previously described, put emphasis on the rehabilitation of general purpose vehicles.

c. *Ordnance Rehabilitation Center*:—There were difficulties in the field in completely rehabilitating all the fifteen hundred vehicles of an Infantry division during a limited rest period, especially if two, three and sometimes four infantry divisions were withdrawn from combat during the same period of time. Just such a situation led to the establishment of a large rehabilitation shop which could rehabilitate general purpose vehicles at a high rate on an assembly-line basis. This shop was used to reduce the overload thrown on the rehabilitation schedule when several divisions were brought

back into rest, and at the same time provided continuous maintenance by rehabilitating vehicles from each division at a steady rate. Eventually this reduced the work necessary during the rest periods and improved the general operating condition of the vehicles. The supporting light and medium maintenance Ordnance companies could not attempt such a program since they worked at capacity on normal division, corps, and Army automotive work. Their load was kept balanced by the Ordnance battalions. Experience in operating this rehabilitation center showed that:

(1) An Ordnance medium automotive maintenance company given the responsibility of a complete vehicle rehabilitation shop in a large building in a rear area and augmented by three hundred civilian (Italian) workmen can maintain a daily output of fifteen (15) vehicles per day. This rehabilitation consisted of all second and third echelon lubrication, inspection and repairs.

(2) For efficient operation it was found necessary to have ninety (90) vehicles in process at all times plus twenty (20) waiting to enter.

(3) Infantry divisions received priority in receiving this rehabilitation service because difficult weather and combat conditions handicapped their effort to perform first and second echelon vehicle maintenance work.

8. Ordnance (MM) Company Sub-Depot Operations

Each Ordnance (MM) company providing third echelon service was charged with the additional responsibility of supplying all of its supported units, except the Ordnance (LM) company which it supported. This provided complete Ordnance support and gave the medium maintenance company complete knowledge of the supply status of the units serviced. In effect, each Ordnance (MM) company acted as a sub-depot, and performed the following supply functions:

    a. Maintained a complete stock record system with minimum and maximum levels.

    b. Delivered items of supply by contact parties.

    c. Maintained an adequate back-order system.

    d. Maintained an "Envelope System" (See "Changes in Ordnance Support of a Using Unit", paragraph 6).

    e. Edited organizational requisitions based on intimate knowledge of the status of the supported unit's equipment.

    This system proved most effective throughout the Italian Campaign in helping to provide uninterrupted Ordnance service.

9. *Fourth Echelon Maintenance Procedures*

    The primary mission of fourth echelon maintenance was to give close and immediate support to third echelon Ordnance units. In order to provide this, fourth echelon, in addition to performing normal overhaul, rehabilitation, equipping, etc., frequently manufactured small parts, continuously rebuilt assemblies and sub-assemblies, and completely disassembled salvaged vehicles and equipment so that maximum use could be made of the parts or assemblies reclaimed. It was found that the most efficient operating procedure was to consider all fourth echelon work unassigned and to have it revert to Army stock upon completion.

    Centralized control of all maintenance companies allowed certain companies to specialize. This arrangement permitted mass production, facilitated using highly skilled personnel (both military and civilian), concentrated critical parts thereby preventing many deadlines, and tended to raise maintenance standards.

    Several of the fourth echelon operations which played an important part in the Italian Campaign are described below:—

    a. *Rebuild Operations*:—There were periods during the Italian Campaign when the supply of major assemblies could not meet the demands which were imposed by mechanical mortality rate. As a result it became necessary to establish extensive rebuild facilities within fourth echelon.

There were two underlying causes for the inadequate supply of major assemblies, both of which were counteracted by the establishment of a fourth echelon rebuild policy. First, the shortage of major items (vehicles) to replace combat losses resulted in proportionate increases in vehicle overhaul operations, and additional major assemblies had to be made readily available to these shops in order that the "downtime" for rehabilitation be held to a minimum. Second, the shortage of sufficient rebuild parts to maintain efficient operation of Base shop mass-production overhaul schedules reduced the number of major assemblies received from the Base section.

To use effectively the limited supply of rebuilt parts, fourth echelon assembly rebuild operations were established, which involved only disassembly, individual part replacement and refitting within the assembly. It was shown that the total parts consumption per unit in this type of rebuild is considerably smaller than that required to perform Base section rebuild which involves complete disassembly and does not utilize individually matched parts from the original assembly.

An indication of the type and volume of work performed by rebuild operations in fourth echelon is shown by the following tabulation of production figures for one Ordnance heavy maintenance company. They cover a three (3) month period during which time there was a shortage of replacement major items, as well as a critical situation with respect to the supply of sufficient rebuild parts to maintain Base shop production. Also during this period 876 vehicles of all types were given fourth echelon repair.

Major Assemblies (all types of vehicles)	Total Quantity Rebuilt
Axle Assy., front	178
Axle, assy., fwd rear	124
Axle assy., rear	181
Carburetor assy.	650
Distributor assy.	637
Engine assy., complete	572

Generator assy.	710
Motor starting assy.	844
Voltage regulator	482
Transmission assy.	207
Transfer case assy.	244

b. *Manufacture of Critical or Special Items*:—Many times during the Italian Campaign it was necessary to manu-. facture critical or special items. Standard items of supply such as firing pins for various weapons, obturator spindle plugs, machine gun booster caps, mortar traversing nuts, steering bushings, hardware, and a considerable number of other items were manufactured in quantity whenever the rate of resupply was not sufficient to meet the current requirements. Improvised mortar night lighting devices, machine gun flash hiders, connecting surgical cuffs for severed arteries, extended tank grousers to improve tank flotation, combat Infantry sleds for combined Infantry-Tank use, and special maintenance tools are a few of the special items which were improvised and manufactured in sufficient amounts to meet immediate tactical requirements. During one week in Fourth echelon alone, a total of 105 different items were manufactured in quantities as high as 835 of some items. This manufacturing of critical and special items was an important phase of Ordnance supply.

c. *Reclamation*:—Originally all salvaged items were stripped to the fullest extent of all serviceable and reclaimable parts by *both* third and fourth echelon Ordnance units. It was found, however, to be more efficient and economical if the complete reclamation of these items were made by fourth echelon. In fourth echelon, cheap, semi-skilled labor which could economically perform a complete reclamation, was readily available, effective use could be made of every part reclaimed, and complete control over reclamation could be maintained.

10.   Supply Procedures

Varying from the early conception of combat Ordnance service, in which balanced Ordnance battalions consisting of

maintenance, ammunition, and depot companies were employed, the vertical organization used by Fifth Army Ordnance assigned to one Ordnance battalion the mission of organizing, administering, and operating all Ordnance general supply depots in the Army. All Ordnance depot companies were assigned to this supply battalion, and were employed generally as follows: One advance mobile field depot supported each Ordnance 3rd echelon battalion; and one semi-mobile Army rear depot, consisting of two depot companies, supported the advance depots and the Ordnance 4th echelon battalion. The supply battalion headquarters was located at all times with the Army rear depot. Balanced Ordnance battalions, including one or more depot companies must of course be employed in special cases such as an initial beachhead landing or independent operation of a corps or division.

a. *Ordnance Class II Depot Battalion (General Supplies)*:—In addition to the administration of the assigned units, the operating functions of the supply battalion were as follows:

(1) Moving depots to maintain close support to maintenance units.

(2) Transferring and balancing stocks between depots by means of periodic depot reviews.

(3) Controlling stock levels within depots.

(4) Anticipating and informing rear supply echelons of quantities of supplies needed during future periods.

(5) Preparing stock reviews on critical and fast moving supplies.

(6) Preparing lists of items in short supply for manufacture by 4th echelon shops.

Ordnance depots supplied using troops through their supporting third echelon maintenance units, as these were the only Ordnance units that directly contacted the using troops for maintenance and supply.

Requisitions from advance depots and units of the 4th echelon battalion were placed on the Army rear depot. The Army rear depot was the sole requisitioning agency on Base. This benefited Base in that only large orders from one

source were received from Army. And it also allowed Fifth Army to know the consolidated status of all supplies in the Army.

Back orders were established and accurately maintained in the Army depots. Approximately 40,000 active stock record cards were in the files of the Army rear depot. (See "Stock Control Procedures" and "Army-Base Inter-operating Procedures", paragraphs 13 and 14).

b. *Major Items Storage and Issue*:—An Ordnance (MM) company was used as a major item depot and distributing company. Its mission was:

(1) To receive, check, store, and issue all major Ordnance items.

(2) To provide constant 1st and 2nd echelon maintenance on all such items, while in the depot.

(3) To combat load, and equip where applicable, all such items with the necessary supplies and accessories, regardless of the service source of such materiel.

(4) To arrange for the shipment of such items from Base.

(5) To assure combat serviceability of all such items prior to issue.

Normally, the delivery of vehicles was made by personnel of this Ordnance (MM) company, but this was an unsatisfactory arrangement as most of these men were skilled mechanics and were needed to process and maintain vehicles in the depot. During periods when the front was advancing, additional demands for vehicles deliveries were made on this depot and deliveries were often made over distances of 100 miles. This generally necessitated using additional skilled personnel from fourth echelon Ordnance maintenance units during a period when increased maintenance demands were also being made upon them. The use of native labor as drivers was not a practical solution.

The assignment to Army of an Ordnance Motor Vehicles Distributing company would solve the vehicle

delivery problem and preclude the necessity of using highly trained men inefficiently.

c. *Redistribution of Critical Items of Supply*:—Due to the extended front covered by Army Ordnance units, it was necessary to provide repair parts and supplies to a great many units dispersed over a large area. This required the establishment of a system whereby parts, no matter where they were stocked, were readily available to all forward units that needed them. Thus, no major item was kept out of service for lack of a part that was on hand in the Army area.

In third echelon Ordnance units, a major item in the shop was considered deadlined when necessary parts for its repair were not available in the unit's stock. When this was the case these parts were immediately requested from the supporting Ordnance depot on a "Deadline Requisition". If the parts were not available at this depot, the supply battalion headquarters was notified. Automatically all fourth echelon units were contacted in order to locate the parts in their stocks, or from salvage operations being carried out by them. In the meantime, the third echelon unit which needed the parts, as soon as they were found to be unavailable in the supporting depot, informed its battalion headquarters which, in turn, contacted all its companies, or if necessary, group headquarters, in an effort to obtain the parts.

By using the system outlined above, the parts were normally found and forwarded to the unit needing them within a few hours. However, if the parts were not located by this means the supply battalion submitted a consolidated "Deadline Requisition" on the Base section Ordnance depot for further action. Such a system minimized the ill-effects caused by any mal-distribution of third or fourth echelon parts.

d. *Maintenance Company Stock Reviews*:—To reduce mal-distribution of 1st and 2nd echelon parts, tools, and accessories, stock reviews of selected items were made. (Mal-distribution of 3rd and 4th echelon parts was negligible and was remedied by the system described in "Redistribution of critical items of supply".)

The procedure used was as follows:

(1) The Army depot battalion periodically prepared review sheets of critical 1st and 2nd echelon parts, tools, and accessories, and forwarded them for completion to each Army non-divisional maintenance company, through the supporting depot company. Piece mark, item, present stock balance, "dues-in" and "dues-out" were the main features of these review sheets.

(2) Maintenance companies filled in requested information and forwarded one copy to the Army depot battalion through the supporting depot company, one copy to its own battalion headquarters, and one copy to group headquarters.

(3) When required materiel was not available in the Base section, the Army depot battalion transferred stock on hand in maintenance companies that had no "dues-out", to maintenance companies that had "dues-out" with no stock on hand to meet this unfilled requisition. These transfers of stock were made through the supporting Ordnance depot company accompanied by copy of the transfer order.

(4) The number of items listed on the review sheets was kept at a minimum to avoid overworking maintenance company supply sections.

11. Evacuation Procedures

The evacuation of Ordnance equipment was accomplished by utilizing the equipment and personnel of Army Ordnance evacuation, maintenance, and supply units. This consisted of:

a. Clearing battlefields of both ours and the enemy's disabled Ordnance equipment, and transporting such materiel to collection and evacuation points.

b. Transporting repairable equipment from forward collection and evacuation points to third echelon shops, fourth echelon shops, or base shops, depending on the echelon of repair required.

      c. Evacuating materiel from lower echelons of maintenance to higher echelons of maintenance.

      d. Transporting salvage materiel to QM Salvage yards.

      e. Daily visits to graves registration units, hospitals, and QM salvage yards to recover Ordnance materiel.

      In addition to their evacuation mission, Ordnance evacuation companies transported the tracked vehicles of Armored units whenever the tactical situation demanded, and delivered tracked vehicles from Army depots to the using units.

      Evacuation from the Army area to the rear is normally a Base section function but due to the limited number of transporters that were available for use by the Base section and the insufficient rail and truck lift, it became necessary for Army Ordnance service to assist in this operation. Because of the long periods of static warfare during the campaign, Army Ordnance was able to assume a portion of this responsibility, but during active operations and a forward movement of the lines all available transporter and truck lift was needed for operations within the Army area. Large quantities of materiel accumulated during these periods in collection points and it was necessary to divert personnel and equipment from other important tasks to guard and preserve it properly. Fourth echelon units were hampered in their attempts to move forward rapidly in close support of advance Ordnance echelons because these large quantities of materiel had to be repaired, salvaged or evacuated.

      During the latter part of the campaign the Base section agreed to take over all collection points within 72 hours of notification of evacuation by Army. To permit an orderly transfer of these areas, Base attached an evacuation section, consisting of one officer and several enlisted men to the Army main collection and evacuation yard which was located in close proximity to fourth echelon shops. Their mission was to reduce as rapidly as possible all materiel in the yards before any transfer was accomplished. They established priorities on materiel to be evacuated; arranged with Army transportation

section, 4th echelon shops and depot companies for all available lift; inspected loaded materiel as to proper crating and preservation; and scheduled the convoys to Base section.

The above evacuation procedures from the Army to Base were expedients to overcome a shortage of evacuation equipment and personnel in the Base section. Sufficient facilities and personnel should be made available to Base sections to accomplish this mission fully, thus freeing Army Ordnance service to perform its primary mission in the Army area.

12. Methods of Reporting on Major Item Supply Status, Maintenance, and Supply Status Changes

Reports were required from all Army Ordnance units to keep Army Ordnance abreast of all changes in supply status of major items and of the status of Maintenance activities. As a consequence, using units were only required to submit materiel status reports every three months. These reports were of three types as follows:

a. *Daily Stock Report.* This form furnished the daily status of all major items in Army stock, giving the following information for each item:

DAILY ARMY STOCK REPORT AS OF 1800 HOURS...........................

FROM: .... TO: ....

Page 1

Item No.	Item	Prev. Total Stock	Recd from Base Sect	Recd from Shop or Trps	Recd Trans- fer	Issued	Stock Balance		
					–		Serv Comp	Serv Inc	Un- Serv

(1) *Previous Total Stock.* Total stock, serviceable and unserviceable, as shown under stock balance on previous day's report.

(2) *Received from Base.* Quantity received in stock from the Base section during the 24-hour reporting period.

387

(3) *Received from Shop or Troops.* Quantity received in stock from fourth echelon shops or from turn-in by troops during 24-hour reporting period. (Used by third echelon companies only in the case of items received from troops and placed in stock instead of being evacuated.)

(4) *Received by Transfer.* Quantity received in stock through transfer of stock from another Army Ordnance unit. (Items received in third echelon companies on Army allocation for immediate delivery to troops were not picked up on daily stock report.)

(5) *Issued.* Quantity issued to troops, transferred to another Army Ordnance unit, turned into Base section or otherwise disposed of from stock.

(6) *Stock Balance.* Current stock balances (previous totals, plus receipts, minus issues and transfers) were divided into *Serviceable, Serviceable Incomplete,* and *Unserviceable.*

b. *Daily Maintenance Report.* This report showed the status of accumulated work and measured the production activity of all Ordnance shops. Items reported on this form included items belonging to troops, in for repair or modification; battle losses in or awaiting evacuation to fourth echelon; and stock items in for repair. For each major item the following information was given:

DAILY ARMY MAINTENANCE REPORT AS OF 1800 HOURS................

FROM :................ (Unit) .... TO :................ (Unit) ....

Item No.	Item	Prev. Total	Rec'd	Repaired	Evac or Salv	Bal on Hand	Under re-pair	Await-ing re-pair	Dead-lined for parts

(1) *Previous Total.* Quantity shown under balance on hand on previous day's report.

(2) *Received.* Quantity of unserviceable items received during the reporting period for repair, salvage of further evacuation.

(3) *Repaired.* Quantity repaired and returned to stock or to using troops during the 24-hour reporting period.

(4) *Evacuation or Salvage.* Quantity evacuated or salvaged during the 24-hour reporting period.

(5) *Balance on Hand.* Total quantity of unserviceable items on hand for repair, salvage or evacuation.

(6) *Under Repair.* Quantity in shop actually in process of repair. (Included in total shown under 5.)

(7) *Awaiting Repair.* Quantity awaiting repair on which work had not yet commenced. (Included in total shown under 5.)

(8) *Deadline for Parts.* Quantity deadlined for lack of critical parts or assemblies. (Included in total shown under 5.)

c. *Daily Major Items Status Changes Report.* Each reporting Ordnance company showed on this form (see below) all major items received and all major items disposed of during the 24-hour reporting period, together with the following explanatory data for each item:

MAJOR ITEM STATUS CHANGES AS OF .... HRS ....

FROM .... ORDNANCE COMPANY (...........) TO: ORDNANCE GROUP ....

Item	Quant Rec'd	From Whom Rec'd	Basis for Receipt	Quant on cl Rec'd	Alloc Req	Quant iss.	To Whom iss.	Basis for iss.	Date Hour Del of Alloca

(1) *Item.* Name of major item.

(2) *Quantity Received.* Quantity received during the reporting period.

(3) *From Whom Received.* Name of unit from whom received; or other source such as "battlefield recovery."

(4) *Basis for Receipt.* Basis for receipt of the item, e.g., unserviceable, excess, stock, delivery, previously reported certificate of loss.

(5) *Quantity on Certificate of Loss Received.* Quantity for which certificate of loss was received from troops.

(6) *Allocation Requested.* Quantity for which allocation was requested.

(7) *Quantity Issued.* Quantity issued, evacuated, salvaged or otherwise disposed of during the reporting period.

(8) *To Whom Issued.* Name of unit to whom item was transferred; or other disposition (such as salvaged, mounted on combat vehicles, etc.)

(9) *Basis for Issue.* Basis for disposition such as Army allocation, direct exchange, certificate of loss, unserviceable, evacuated, salvage, stock transfer.

(10) *Date, Hour, Delivery of Allocation.* Date and hour that delivery of items on Army allocation was accomplished.

These reports proved invaluable in maintaining a continuous record of the quantity of Ordnance major items in the hands of each Fifth Army unit, in determining battle losses and recovery, and in knowing the status and production of all maintenance activities.

13. Stock Control Procedure

The following stock control procedures were standard in Fifth Army Ordnance Service:—

a. *Stock Levels:*—Maximum and Minimum stock levels for each item were established and posted on each stock record card. Maximum levels were established at a 15 day level of Ordnance Class II supplies in the Army depot battalion. The basic load of divisional and non-divisional maintenance companies was interpreted as 15 days of supply with a maximum of 25 days and a minimum of 5 days. The minimum level for the Army depot was also 5 days. The amounts needed to meet these levels were adjusted frequently to reflect actual issues over a similar period of time and under similar conditions. Anticipated additional needs such as seasonal requirements were requisitioned only when a definite known requirement existed. Excess stocks accumulated by changes in the density of equipment supported, turn-backs from using troops for which they had no further use, and reclamations, were not necessarily evacuated from third echelon maintenance

companies if they did not exceed a maximum level of 45 days. Depot and fourth echelon maintenance units were authorized a maximum level of 60 days for all excess stocks acquired in the same manner. An up-to-date list of the quantities and types of major items being supported were maintained at all times and adjustments of stock levels were made when significant changes occurred in the quantities of items supported.

b. *Requisitioning Objectives*:—Non-divisional and divisional maintenance companies and the Army depot requisitioned on a 30-day objective. In the case of the maintenance companies they requisitioned dues-out plus 25 days authorized maximum level plus 5 days ordering to shipping time. The Army depot battalion requisitioned dues-out plus authorized 15-day level plus 15-day ordering to shipping time.

c. *Inventory of Stocks*:—Each maintenance and depot company made a complete physical inventory of all stock once every 30 days. This inventory was scheduled throughout each 30-day period, approximately one thirtieth (1/30) of the stock being inventoried each day, in order to cause the least possible interruption to normal operation.

d. *Operation of Unit Stock Record System*:—All units adjusted their stock control system, where necessary, so that stock cards were located centrally. All transactions concerning requisitions, receipts, issues, dues-in, dues-out, cancellations, and adjustments were controlled from this central point. Practices which tended to decentralize the stock control system and which resulted in inaccurate stock control procedure were eliminated.

e. *Requisitioning Schedule*:—All maintenance units submitted regular requisitions for stock on their supporting Ordnance depot, in accordance with a schedule established by the Army depot battalion. This schedule was so arranged that requisitions for each SNL group would be received in the Army depot battalion during the 10-day period preceding the day the Army depot battalion requisition was submitted to the Base Section. Only deadline and emergency requirements were

requisitioned at other than the regularly scheduled times. If unusual demands or other unforseen reasons reduced the stock level below the minimum before the scheduled requisitioning date an emergency requisition was submitted.

f. *Confirming Requisitions*:—All Ordnance maintenance companies submitted confirming requisitions to their supporting depot once every 90 days. The schedule for submitting confirming requisitions was established by the Army depot battalion, so as to coincide with the schedule of regular 10-day requisitions. Confirming requisitions for each SNL Group were scheduled to be submitted by all companies during the same 10-day period. The confirming requisitions showed total amounts on hand, due-in and required for each item on the requisition, and listed all items for which the stock record card showed dues-in, or for which there was a requirement. The depot made new postings on their stock record cards on the basis of the total dues-in plus amounts shown in the "required" column of the unit's confirming requisition. Such new posting automatically brought about a balance between depot dues-out and unit dues-in. When stocks of critical items were recived in Army depots in insufficient quantities to fill all dues-out, back orders were given priority in accordance with standard operating procedure for deadline requisitions.

g. *Interchangeability and Substitution*:—The Army depot battalion prepared interchangeability studies which were published in the Ordnance Operations Bulletin from time to time. All companies having new or additional information on interchangeability forwarded it to the commanding officer, Army depot battalion, for editing, consolidation and publication for the benifit of all concerned. Stock record cards were cross-referenced for interchangeability, both within SNL group and between SNL groups. All companies posted substitutions made by the Army depot battalion to stock record cards, using as a basis the returned copy of their processed requisition.

h. *Requisitioning of Non-addendum Items Replaced by*

Kits and Items for which a Newer Item was Substituted:—(1) If a company needed non-addendum items to remove vehicles from deadline, a special requisition was submitted to the Army depot battalion, and an effort was made to procure the items from salvage or from the Base section.

(2) Items formerly requisitioned separately but which appeared in the addenda as part of a kit were continued to be requisitioned separately until stocks in Army depot battalion were exhausted, at which time the Army depot battalion automatically substituted the kit containing the desired part. Thereafter the kit was requisitioned.

14. *Army and Base Inter-Depot Operating Procedure*

During the greater part of the Italian Campaign approximately 75% of all Ordnance items (at times as many as 20,000) requested by Army were not available at the Base section and consequently had to be back-ordered. This made it necessary to establish and to maintain an efficient Army-Base inter-depot operating procedure. Specific details of the system used were:

a. *Requisitioning Procedure*:—

(1) Normal requisitions were prepared by the Army rear depot listing "dues-in" and the date of the SNL used in preparing the requisitions. These requisitions were submitted in quadruplicate, on a 10 day schedule, to the requisition section at the Base section who receipted for them, registered them, and submitted all copies to the Base section shipping section through the Base editing section.

(2) Immediate action requisitions were submitted at any time and were processed as indicated above.

(3) Requisitions for heavy lift items and assemblies were prepared separately by the Army rear depot.

b. *Action by Base Section*:—

(1) *Editing Section*:—Army rear depot requisitions were edited for nomenclature, authority, and the inclusion

of fifth echelon parts. Extracts of items not approved for issue by the Base section were forwarded immediately to the Theater Ordnance officer with an information copy to the Army rear depot.

(2) *Shipping Section*:—The Base section shipping section retained one copy of the requisition and forwarded three copies to the operating groups (Tally-outs or shipping orders showing Army rear depot requisition numbers accompanied all shipments.)

(3) *Operating Groups*:—Base section operating groups indicated on all copies of the requisitions the quantities filled and after selecting the stock forwarded two copies direct to the control group and one copy with the materiel to the packing or shipping section. All copies of the requisition were signed and dated by the person selecting the stock.

(4) *Stock Control Section*:—The Base section stock control section posted the quantities issued and any quantities which were back-ordered on appropriate stock record cards. After posting, one copy of the requisition was marked ''posted'' and was filed. The other copy was immediately dispatched to the Army rear depot by a special Army rear depot courier service. A register was maintained at the Base stock control section showing the date this copy was dispatched and the Army rear depot courier receipted for the returned requisition.

c. *Back-Order Releases*:—Back-order releases were also made out in four copies and were handled in the same manner as requisitions.

d. *Correction Sheets*:—Correction sheets were prepared by the Army rear depot on ''over'' or ''short'' shipments and were honored by the Base section and posted accordingly.

e. *Readjusting Records and Expediting Shipments*:— Army and Base Section records were periodically adjusted by cancellation or re-requisitioning. Critical item stock reviews of each SNL group on a 10 day schedule were prepared by the Army depot battalion to inform the Base section of the items on which expedited shipment was desired.

15. Balanced Artillery Firepower

In order to effectively sustain artillery in the combat zone, it was found that the shipment or resupply of artillery tubes, recoil mechanisms, spare parts, and all other supplies which are consumed in proportion to the amount of ammunition expended should be based on the quantity of ammunition shipped. This, in essence, is ''Balanced Artillery Firepower''.

To establish and sustain ''Balanced Artillery Firepower'' in the Army, it was necessary to know the ammunition allocation to Army for the coming month, the number of weapons serviced, the life expectancy and status of critical artillery assemblies, and estimates on the future operational use of these artillery weapons. To facilitate this, all Ordnance companies charged with the responsibility of maintaining artillery in the hands of troops, submitted bi-weekly reports which, in brief, estimated the number of replacement tubes, recoil mechanisms, equilibrators, gas check pads, etc., required during subsequent periods for the number and types of artillery indicated on the forms. In addition, the reports gave the status of tubes at the end of the reporting period (i.e., the estimated remaining life of the tube in rounds by the best obtainable information on the expected future number of rounds to be fired per day per gun) and the number of rounds fired on the various tubes, recoil mechanisms, equilibrators, and gas check pads replaced since the last reporting period. (Since valuable information on the expected life of tubes, recoils, etc., was obtained from these reports, each assembly replaced due to causes other than normal wear was appropriately marked.) Based on these reports and on the ammunition allocation to Army, a monthly requisition on the Base section depot was prepared at the Army Ordnance depot showing the requirements for the coming month (broken down into three 10 day periods). A stock review showing the status of present supplies was also given.

''Balanced Artillery Firepower'' proved itself not only an excellent means of maintaining serviceable artillery in the hands of troops and of planning for future requirements, but

it provided considerable technical data on the performance and life expectancy of tubes, recoil mechanisms, equilibrators, and other artillery materiel.

16.   Replacement of Major Items

Fifth Army Ordnance maintenance units were authorized to issue immediate replacements for unserviceable major items on a direct exchange basis, i.e., the exchange of an unserviceable item for a like serviceable item. Due to the inability of Theater Ordnance service to sustain the Army level of serviceable reserve major items this was not always possible, in which case, the using unit obtained replacement by one of the following methods:

a. *Certificate of Loss*:—By presenting a certificate of loss to the supporting Army Ordnance Maintenance unit in exchange for the replacement major item. This method applied only to uncontrolled items.

b. *Allocation*:—By allocation from Army G-4, upon request of the Ordnance maintenance company. This allocation was based upon a certificate of loss or upon the receipt of a like unserviceable item. This method applied in the case of certain controlled (sometimes critical) major items short in supply.

c. *Automatic Replacement*:—By the automatic replacement of shortages, by allocation, based on reorganization reports or periodic status reports. In this method requisitions were not submitted by the using unit.

The daily status reports (see "Method of Reporting on Major Item Supply Status, Maintenance, and Supply Status Changes") made rapid replacement possible. These reports which were rendered as of 1800 hours by all Army Ordnance units and consolidated that night in the 4th echelon group, were ready to be acted upon in conjunction with Army G-4 the following morning.

The immediate replacement of Artillery weapons required maintaining an Army reserve large enough to permit these

major items to be kept in the areas of the third echelon Ord-
nance maitenance companies, and in some cases even in
lower echelons where they were ready for immediate issue.

17. Replacement of " War Weary " General Purpose Vehicles

Since replacement general purpose vehicles were not
received at addendum rates, it was necessary to expend great
amounts of labor, time, and spare parts on vehicles which had
considerable mileage on them. Experience proved that this
was uneconomical in view of the probability of their future
inefficient operation and constant need for additional repairs.
A large number of deadlined vehicles usually resulted because
the allowances of parts and assemblies, which were predicated
on the receipt of replacement vehicles at addendum rates,
were not adequate to meet the additional demand caused by
repairing these ''war weary'' vehicles. .

In order to ascertain the status of Army's transportation,
to recommend replacement of certain ''war weary'' vehicles,
and to plan for future requirements, mileage surveys were,
made by Ordnance at appropriate intervals. Within the limits
of the replacement vehicles made available by the War
Department, a program of replacement of ''war weary'' veh-
icles was initiated.

The need for vehicle replacements at or approaching ad-
dendum rates, in order to maintain efficient operation, was
amply demonstrated.

18. Introduction of New Equipment

Whenever new items of equipment are issued to an Army
for combat use, sufficient spare parts and special tools should
be provided simultaneously. Also appropriate manuals, items
of equipment for instructional use, and pertinent tactical and
technical instruction (including technicians) should be provided

in advance of the arrival of the new materiel. Complete technical instruction should be provided to the supporting echelons of maintenance in addition to the pertinent tactical and technical instructions which should be given the using arm. Such a policy will allow rapid employment of the new materiel by the using arm and will insure that the new equipment will be adequately maintained by supporting echelons.

19. Utilization of Local Resources

The selection, training and utilization of native labor and the exploitation of local machinery and materiel materially assisted Ordnance maintenance and supply. The purchasing and contracting sub-section of Fifth Army Ordnance service had the responsibility of supplementing, from local sources, the supplies and Ordnance spare parts received from the Zone of Interior. Both raw materiels, and manufactured items were procured. Structural steel and steel sheets comprised the greater part of the raw materiels, with brass, copper, aluminium, and wood in many forms completing the list. The list of manufactured items was large and varied. Nails, screws, nuts, bolts, hinges, sewing machines, sealing wax, paint, paper, electric motors, thread, watch makers' tools, and grinding wheels were part of the list. In many cases items were manufactured by Italian firms on orders placed upon them by Fifth Army Ordnance service. In the Florence area, there were four machine shops, two sawmills, and a bronze foundry working exclusively for Ordnance. The establishments were managed by various Ordnance 4th echelon companies, and production directed by the 4th echelon Ordnance battalion. The purchasing and contracting section settled any claims which arose out of these arrangements and furnished raw materiels for the work.

In addition to the above, some 3,000 tops, truck, ¼ ton, C & R, were manufactured; 2,000 engine crates constructed; 80,000 brake-lining rivets, 5,000 truck bows, 15,000 metal bow corners, 15,000 feet of one inch rope, 450 boxes sniper's rifle,

30,000 brake lining shims, and about 700,000 stock record cards and parts cards of different types, were a few of the other items manufactured. Some projects were very involved, as in the case of the tops, truck, ¼ ton, C & R, when canvas, thread, grommets, straps, and buckles were purchased or manufactured and gathered for fabrication. The construction of the engine crates involved logging operations which included the sawing of logs and cutting the lumber to size. The crates were assembled with nails manufactured particularly for that job.

Early in the Italian Campaign, when the shortage of Ordnance maintenance and ammunition personnel became acute, towns and villages were scoured for men of definite mechanical skills and for laborers to store and issue ammunition. Many thousands were screened, trained and re-screened until there were over 6,000 Italian civilians working with Fifth Army Ordnance units. Hundreds of these employees were skilled and semi-skilled machinists, mechanics, electricians, welders, carpenters, ammunition handlers and other artisans who lived and worked with the units. Their contribution to the Fifth Army Ordnance effort of furnishing uninterrupted Ordnance service to the combat troops was considerable. They lived and worked in the closest harmony with the American soldier and developed a fine spirit of unit loyalty and efficiency in production.

20.   Watch Repair in the Field

The extent to which facilities for watch repair in the field (particularly in third echelon) should be provided has always been a controversial issue, but experience showed that, in order to provide satisfactory Ordnance service to the troops in combat, it was necessary to have watch repair service available in third echelon Ordnance shops.

The following summarizes the experience of third echelon in watch repair service.

a. *Repairs Without Parts*:—A survey revealed the following facts concerning the average watch repair schedule per 30 days in each medium maintenance company:

No. Watches Received in Shops.	No. Repaired w/out parts.	No. Repaired w/straps and Crystals.	No. Repaired w/other parts	No. Evacuated
170	102 (60 %)	17 (10 %)	34 (20 %)	17 (10 %)

i.e,, 60% of the defective watches were repaired without parts and an additional 10% were repaired by simple crystal and strap replacement. Civilian type watches accounted for about 20% additional load and were necessarily repaired without regular issue parts.

b. *Preventative Maintenance*:—Since third echelon watch repair service was convenient, and only required a minimum of down-time, the using arm consistently made use of this service for routine inspection as well as repair. Thus, this system was responsible for maintaining a large number of watches in continuous satisfactory operation.

c. *Only Limited Number of Parts Required*:—It has been found that only a limited number of parts were needed in large quantities and if watchmakers' lathes were available at least four of these items could be manufactured. The items which should be provided in abundant quantities in all repair kits are:

(1) Staff, balance
(2) Arbor, winding
(3) Crown
(4) Crystal
(5) Spring, main assembly
(6) Straps, web or lea., w/buckle
(7) Spring, hair assembly
(8) Stem, winding
(9) Hands
(10) Balance jewels
(11) Screws

Most other parts can be obtained by cannibalization.

d. *Effective Utilization of all Parts Available*:—A system of cooperation among all Ordnance companies of making the best use of all available parts regardless of where they were stocked was effected.

e. *Watch Repair Tools*:—It was found that Tool Set, Junior Watch Repair No. 2 was not complete enough for efficient operation. The most necessary tools for watch repair in field were:—

1. Staking tool and punches
2. Truing calipers.
3. Roller remover.
4. Air blower.
5. Screwdrivers.

6. Main spring winder.
7. Anvil.
8. Wrenches for waterproof cases

Other supplementary tools which proved useful were watch-makers lathes, washing machines, oil cups and devices for inserting plastic crystals.

f. *Watch Repair Facilities*:—A watch repair shop in the field should be separate from the instrument shop, be free from dust, provide adequate working space, be easy to heat, have ample illumination and be sufficiently mobile. The most practical solution to this problem was a trailer of medium size, either one improvised from a salvaged 2½ ton truck frame or one built on an enlarged 1 ton trailer. With a wise selection of materials and some ingenuity, all of the above features can easily be incorporated in a shop constructed on a 1 ton trailer.

21. Brake Drum Turning and Relining

Wet and muddy operating conditions necessitated frequent replacement or relining of brake drums on general purpose vehicles. Experience during two rainy seasons in Italy showed the necessity for providing adequate brake turning and re-lining facilities. Sufficient supplies of brake lining, shim materiel, rivets, and replacement brake drums must also be provided.

An effort was made to have brake drum turning machines in the lowest echelon possible. Each Ordnance medium mainte-nance company should have one or if this is impossible at least one machine should be in each Ordnance battalion. As

an expedient a turning machine for the repair of ¼ ton truck brake drums was improvised by using a mandrel with the standard issue lathe. An improvised "stick" micrometer for measuring the amount that the brake drum is turned down also has proven valuable.

22. Ammunition and Bomb Disposal Policies and Procedures

a. *Types of ASP's used*: In general, there were two types of ASP's which were used extensively during the Italian Campaign. They were the area-type storage and roadside-type storage. This latter type storage was used whenever the ground was not suitable for area-type storage. Area-type storage generally consisted of bays of 10 or 16 thirty-ton stacks each 30 yards apart. These bays were separated by approximately 500 yards, whenever possible. In roadside storage, bays of 10 to 16 thirty-ton stacks 30 yards apart were stacked along a secondary road. These bays were also placed about 500 yards apart whenever possible. More strict compliance with this inter-bay safety distance was observed during dry weather.

b. *ASP Locations*: ASP's were located as far forward as was considered tactically feasible. Since this made ammunition readily available, it tended to prevent units from carrying excess loads which they might later have to abandon and, of course, shortened the turn-around time for using troops convoys. When a request was received from corps for the location of an ASP in a general area, representatives from the Army ammunition service (ammunition field headquarters) made a reconnaissance of this area. When the tactical situation permitted representatives from the corps ammunition section, the Transportation section, the Engineer section, and the corps or Army G-4 section accompanied the Army ammunition service representatives. A suitable area was selected and a reconnaissance report prepared. This report estimated the stockage capacity and recommended major improvements

such as roads, culverts, drainage, bridges, etc., where neces-
sary. The Transportation officer recommended the road nets
to be used, and, since suitable areas were limited, the G-4
section representative approved the selection of the area for
clearance priority. In fast moving situation, as ASP locations
were selected by the reconnaissance party, guides were left
at the necessary points to give the necessary directions to the
ammunition company which was following the reconnaissance
party at several hours interval. Several hours after the
ammunition company arrived at its new location the ammu-
nition convoy would begin to arrive, and at times these trucks
were unloaded into the trucks of using units, which were
ready to begin drawing.

　　c. *Ammunition Status Reports*: Each ASP submitted a
daily status report as of 1800 hours containing the following
information:—

<div align="center">STATUS CLASS V STOCKS　　ASP............................</div>

<div align="center">●　　　TONNAGE REPORT........................</div>

TO : . . . . (Unit)	BALANCE LAST REPORT........................
	RECEIVED . . . .
FROM : . . . . . (Org. & Coord)	ISSUED . . . .
FROM : . . . . . (Hour & Date)	DEPOT TRANSFERS . . . .
TO : . . . . (Hour & Date)	BALANCE ON HAND . . . .
NO :	

Code	Nomenclature	Bal. last Rpt	Rec.	Combat issue	Train issue	Bal. O/H	Depot Trans.	Transd to Base

These reports were consolidated at the ammunition field
headquarters in two ways, one was a consolidation showing
the closing balances in all ASP's; the other was a consolidation
of the entire daily status report.

　　　　For critical items of ammunition, a daily report,
which showed the closing balances of each ASP· as of 0600
hours, was prepared to inform the corps Ordnance officers
of the quantities of these items available for use by their
troops.

　　　　Telephonic status reports were also submitted by
ASP's when unexpected issues brought the balances of certain
types ammunition to a low level.

<div align="center">403</div>

d. *Use of Rolling Reserves*:—Following the breakthrough from the Anzio Beachhead and the rapid advance north of Rome, combat units were normally out of range of the ASP's before they were completely stocked. It was apparent that mobile supplies of ammunition should be maintained behind the troops. To provide this, a rolling reserve of 100 trucks carrying a total of 400 tons of ammunition was set up to supply IV Corps. This rolling reserve was maintained until the operations became static enough to again warrant the using of ASP's.

e. *Ammunition Stockage Levels*:—The corps gave the stockage "target" for forward area ASP's which generally was six days supply of artillery ammunition and two days supply of small arms ammunition. To facilitate resupply when lines of communication were uncertain or greatly extended, reserve depots were established in the Army area and stocked as directed by Army G-4.

f. *Modification and Repacking of Ammunition*:—Large quantities of 3″, 90-mm, and 76-mm smoke shells were modified by drilling recesses in the TNT fillers and refilling these shells with HC smoke composition. A number of modifications on various shells to accept the deep cavity-VT fuzes were made. A large number (sometimes 1,000 per day) of propaganda shells were prepared for use on the Anzio beachhead. A considerable number of fuzes were changed from one type of ammunition to another to provide special types of ammunition, and to alleviate critical shortages of standard types of ammunition. Repacking of ammunition was done where necessary.

g. *Segregation of Ammunition by Lot Number*:—In order to increase the accuracy of artillery fire, efforts were made to provide firing units ammunition segregated by lot number. As far as possible, emphasis was placed on the delivery to ASP's of large amounts of ammunition so segregated. However, unless the Theater receives ammunition by lot number it is practically impossible for Army to affect the segregation. That is true especially for those types of ammunition which are

used in large quantities or during periods when the front is advancing.

This basic method of increasing the accuracy of artillery fire power should be constantly used to as great a degree as practicable. After this has been accomplished further refinement with respect to large caliber, high velocity cannon can be effected by calibration.

h. *Fire Fighting on the Anzio Beachhead*:—Fire fighting on the Anzio beachhead was a serious problem as is indicated by the following facts:

(1) In 121 days 65 fires were started.

(2) The 65 fires destroyed 3807.9 tons of ammunition to an average of 58.6 tons per fire or 31.5 tons per day.

All precautions such as dispersing ammunition and locating it in an area not subjected to constant shelling were immediately effected. The placing of the ammunition in holes scooped out by bulldozers was not practical because of the terrain. Water collected in these holes and efforts to provide drainage by boring holes with Signal Corps augers were almost entirely unsuccessful. "L" shaped bunkers were then built above the ground. These bunkers, made by bulldozers, consisted of 4 to 6 feet high banks of earth placed between the ammunition and the enemy. About 30 tons of ammunition were placed behind each bunker, with a 30-yard interval between each bunker and an interval of 200 yards between each group of 10 bunkers. Besides protecting the ammunition these bunkers provided a shield for the fire fighters as well as a source of the dirt to put out the fires.

Several of the methods used to extinguish fires were:

(1) A T-2 tank retriever or M4 tank with a bulldozer blade was used to approach and segregate burning stocks, then to cover the fire with dirt.

(2) M2 half tracks equipped with three 40 gallon foamite fire extinguishers helped to extinguish the fires.

(3) Engineer fire fighter trucks provided additional aid.

i. *Use of Foreign Ammunition*:—Efforts were made to use

foreign armament and ammunition, but a considerable number of difficulties were encountered. It was practically impossible to obtain all the necessary ammunition components, i.e. the correct projectiles, propelling charges, primers, fuzes, etc. Large quantities of one component would be available, but the other components would be unavailable or available in such small quantities as practically to eliminate the value of its use in a tactical role. However, Italian 81mm mortar ammunition which could be fired in American mortars was used when the supply of standard ammunition was critical. Firing tables for use of this Italian ammunition in American mortars were prepared and distributed to the troops with pertinent information for its use. German 88mm and 15cm ammunition was used to a considerable extent in weapons captured from the enemy.

j. *Bomb Disposal Activities*:—Bomb disposal squads were located at Corps headquarters and at other key locations in the Army area to provide complete bomb disposal service. Because of limited aerial activity it was necessary for these squads, which had been trained in bomb disposal technique for enemy matériel, to be used almost entirely for the disposal of American bombs on which they had not been trained. In addition to their bomb disposal duties they helped to identify enemy artillery shells from duds or shell fragments. By Theater directive it was a bomb disposal function to clear only enemy ASP's of mines and booby traps, but in emergencies other areas were also cleared. More effective bomb disposal service was given by impressing all units with the importance of rendering accurate reports on the location of unexploded missiles and the necessity of making estimates of whether it was urgent that the missiles be deactivated or removed.

23.   *Special Projects and Field Expedients*

It was often necessary to modify existing equipment to meet current tactical requirements or to eliminate defects

which caused an excessive amount of maintenance work. It was also necessary at times to design and manufacture new items of equipment to meet immediate tactical or maintenance demands. Ordnance field group headquarters had a special section for encouraging, investigating, reporting on and expediting the use of field expedients which increased the effectiveness of the materiel or decreased maintenance work. By means of an Army ordnance operation bulletin information concerning these field expedients was disseminated to all echelons including the Chief of Ordnance, where they formed the basis for appropriate modifications or for new designs. The maintenance sections of the groups or battalions usually handled the special projects. A few of the special projects and field expedients which were improvised and manufactured and which were not of a purely technical nature, are described below.

a. *Track Devices*: Extended grousers designed to give added flotation to a tracked vehicle traversing marshy terrain were manufactured and used by the Fifth Army. During the period 7 April to 12 May 1944, a total of 15,302 of these grousers were modified in order to complete this project in time for the break-out from the Anzio beachhead.

During the icy winter weather several types of traction devices mainly of a spike type were designed as a temporary field expedient for use with steel track on tractors or tanks.

b. *Front End Type Hoists*: Considerable use was made of improvised front-end type vehicle hoists. These hoists proved invaluable in unloading supplies, moving bulky equipment and in various maintenance operations, such as replacing engine assembles.

Front end type hoists were improvised for the ¾ ton truck, the 2½ ton truck and in a limited degree for the ¼ ton truck. In general, these hoists consisted of four (4) main components:

(1) *The "A" Frame*: Generally constructed from 2½"—3" dia. steel pipe (8-16 feet long) reinforced at appropriate sections.

407

(2) *Guy Cables*: Generally ⅜″—½″ steel cables reaching from the top of the "A" frame to the vehicle frame or some other suitable place behind the cab of the vehicle.

(3) *Winch and Cable*: Generally an integral part of the vehicle.

(4) *Outrigger*: A device for relieving the vehicle frame, spring, and axle of heavy loads.

When a front-end hoist was used on a ¼ ton truck it was generally necessary to reinforce the frames, spring, and to mount a ¾ ton vehicle winch (driven by a GDA 7275 power takeoff for amphibian C & R G-504) in the rear.

c. *Velocity Measurements of Artillery Tubes*: Velocity measurements of artillery tubes were used to determine tube wear and life expectancy. Valuable data were collected and estimates of the life expectancy of several types of artillery tubes revised upward. Velocity measurements to effect calibration of artillery tubes are practically valueless, unless ammunition is received by lot numbers.

d. *Track Preference in Combat*: Surveys of all Fifth Army units were conducted to learn the type of track in use on all full track vehicles, the percentage of life remaining in the rubber track in use, and the preference of the using arms as to track type. These surveys revealed the following preferences of the crews of the various types of full track vehicles.

(1) M31 (T-2) and M32 (T-3) tank recovery vehicle operators almost universally preferred rubber chevron track.

(2) Artillery and AAA units equipped with M4, 18 ton, high-speed tractors preferred rubber chevron track.

(3) Crews of all M4, M4A3 and M4A3E2 medium tanks almost universally preferred rubber chevron track as first choice and steel chevron as second choice.

(4) M-7, 105 Howitzer motor carriage and M10, 3″ Gun motor carriage operators preferred rubber chevron track as first choice and steel chevron track as second.

(5) The crews of M-5 and M5A1 light tanks and M8, 75mm howitzer motor carriage, preferred flat rubber

track. They believed that a chevron rubber track for light tanks and M8 motor carriages would be better than any type track issued.

(6) No general conclusions were obtained on the preference of various units equipped with M-5, 13 ton, high-speed tractors.

Complete status reports on each organization consisting of statistical data on the type of track used and its remaining life were published for the information of all concerned.

e. *Modification of 40mm (AA) Gun for use against Ground Targets:* At the request of the Fifth Army Anti-Aircraft command several 40mm (AA) guns were modified for use against ground targets. The conversion involved the following modifications which in no way prevented reconversion of the weapon to AA use:

(1) Mounting a panoramic telescope on the breech casing.

(2) Providing azimuth and elevation indicators.

(3) Improvising means of locking the weapon in azimuth and elevation.

f. *Improvised 4.5" Rocket Launchers:* Rocket launchers were improvised in order to obtain added fire power when other ammunition was in short supply. Rocket launcher tubes and ammunition were obtained from the Air Corps for this purpose. Two types of launchers were designed; one was a tank-turret mounted 7.2" launcher modified to carry fifty-four 4.5" tubes; the other consisted of a group of fifteen 4.5" tubes mounted on the 37mm (AT) gun carriage. These weapons were used primarily against lightly fortified ground targets or for harassing fire.

g. *Manufacture of Infantry Sleds:* Infantry sleds, which were designed to be towed behind tanks, were manufactured by Fifth Army Ordnance in order to provide direct infantry support of armor in the Anzio beachead breakout. Since it was necessary to make twelve sleds for each tank (1 man in each

sled) there was a critical demand for materiels such as channel iron, sheet steel and iron, and welding rods. By combining all materiels available in Fifth Army, the Base section, and from local purchase, and by using Ordnance personnel from Army augmented by welders and equipment from the Base Section on a 24-hour-a-day 8-hour shift basis, a total of 360 sleds were manufactured by the deadline date.

h. *Tank Fascine Carriers*:—The fascine carrier consisted of an M4 or M4A1 medium tank with the turret basket removed and the turret replaced by a superstructure to carry a cylinder six feet in diameter and twelve feet in length composed of saplings formed around an internally-braced engineer corrugated covert pipe, 12 feet long and 3 feet in diameter. The superstructure was bolted to the turret ring of the tank and the tracks that permitted the fascine to roll down the front of the tank were welded to the hull. The fascine was held on the superstructure by two cables fastened to the carriage at one end and to the quick release mechanism at the other. Nineteen fascines were manufactured by Ordnance to permit the crossing of ditches and small deep streams that would ordinarily stop a tank, but obstacles not large enough to warrant the use of an ark. In operation the carrier approached the ditch and at the proper instant the assistant driver operated the release mechanism, dropping the fascine into the ditch. The carrier, succeeding tanks and wheeled vehicles could then proceed over the obstacle. Tanks modified as arks or fascine carriers were not permanently unserviceable for the normal tank role. Both the ark and fascine modified tanks could function as a normal tank when the modifications were removed and the turret and basket replaced.

i. *M4 Tank Ark Assault Bridges*:—Fourteen tank ark assault bridges were made by removing the turret and turret basket from a M4 or M4A1 tank and installing on the hull, two sections of treadway bridge spaced so that the bridge could be used either by general purpose or combat vehicles. The approach and departure ramps,

and the main bridge were modified M2 or M1 Engineer treadway sections. A superstructure of 6″ I-beam and gusset plates was welded to the hull and supported the main bridge on the top of the tank. The main bridge ramps could be removed so that the engine could be replaced. In the travelling position the departure or front ramps were carried at a 45° angle to the horizontal, the approach or rear ramps were carried at a 30° angle to the horizontal. The ramps were held in the travelling position by two king posts (one for the forward ramps and one for the rear ramps) and a system of 6 cables. Two quick releases located inside the tank permitted dropping the ramps when the ark was in desired position. The ark was an offensive weapon used to make fast crossings of canals and like obstacles that would otherwise be tank barriers. In action, the ark was run into the ditch and its ramps dropped, thus forming a bridge over which vehicles and tanks might cross the obstacle. The ark was water-proofed up to the turret ring for use in streams and canals.

Chapter Ten

QUARTERMASTER

QUARTERMASTER

1. *Organization of the Office of the Army Quartermaster in the Fifth Army*

When it came time to organize the Quartermaster Service of the Fifth Army there was no established modern precedent to serve as a guide. Field Service Regulations and Field Manuals offered only vague suggestions, and since the writing of available texts, warfare had become so fundamentally different that they were largely valueless. There was, though, a wealth of information in technical histories of past wars from the Civil War through the First World War, but it all had to be dug out and evaluated against the requirements of the planned campaign before it could be used.

The only recently published document that was of any assistance whatever in planning the interior organization of the Office of the Army Quartermaster was a War Department Table of Organization which listed the total personnel, with some breakdown into grades and ratings. Even this was not entirely suited to fit the requirements of the coming situation.

No text or manual described in detail the responsibilities of an Army Quartermaster in the field. Again, there was nothing specific in Field Service Regulations, in Field Manuals, or in Army service school texts. There was little up-to-date experience data to be found in the War College Library or in the Library of the Office of the Quartermaster General.

Starting with the basic premise that an Army Quartermaster in the field would probably not be expected to furnish any fundamental service that is not provided by a post, camp, or station Quartermaster, the Army Quartermaster and two or three assistants sketched out an operating procedure to be used in the field. Quartermaster problems that had been encountered in the North Africa landings, and by II Corps in Tunisia, were closely studied to develop a complete Standard Operating Pro-

cedure which retained its effectiveness throughout the Italian Campaigns.

With the completion of the Standard Operating Procedure came the problem of selection and development of officer and enlisted personnel. The Army Quartermaster wanted the best staff he could organise to assist him in the performance of the following which he visualised to be his duties:

a. To keep the Army Commander and his Staff informed on all Quartermaster affairs.

b. To do the necessary planning, coordinating, advising, and supervising on all matters pertaining to Quartermaster activities within the Army.

c. To supervise the work of all subsections, issue instructions, and pass on all matters of policy within the Section.

d. To keep informed on the tactical situation and on all matters of interest to the Quartermaster Section.

e. To command the Quartermaster Service.

In developing the staff, individuals were selected who, in so far as they were available, had had combat Quartermaster experience. The size of the staff was initially kept to a minimum, in order to expand in the field, along with the expansion of the operation, on a trial and error basis, until the most desirable individuals to complete the organization were found.

It was fortunate that while the Fifth Army was being organized in Oujda there was time for training personnel. Classes were held daily on all aspects of Quartermaster service in the field, with added instruction given in the evenings. Map problems, based on the tactical situations which had been encountered in Tunisia, provided specific bases for the study of supply functions. All enlisted men took part in this instruction, and often presented phases acting as officers.

With the background of his task in developing his Office and his experience during the Italian Campaign, the Army Quartermaster set forth the following as criteria for the selection of the key officers of an Army Quartermaster Service:

a. All should have had combat Quartermaster experience, rank should be a minor consideration; all should be well versed in staff procedure.

b. The Administrative Officer must have a sound knowledge of the functional responsibilities of staff sections; should know thoroughly the proper routing of official correspondence; and should know the relation of the Adjutant General to other sections.

c. The Operations Officer, particularly, must have first-hand knowledge of staff procedure, and it is desirable that he have a Service School background. He must have direct knowledge of field supply installations, and know the echelons of supply from company to Army. He must be thoroughly familiar with the functional relationship between the Army Quartermaster and the G-4 Section.

d. The Graves Registration Officer should have had field experience in handling the dead, but it is unimportant that he have had experience as a mortician. He must know what problems are met by small units in handling the dead. His work is of utmost importance to the Army Commander. More repercussions of a military, political, or morale nature can arise from poor regulation of Graves Registration Service than from any other section under the Quartermaster. He must be meticulous in keeping records that may be used for many years.

e. The Class I Officer should have had field experience with a division or smaller unit rather than with a higher headquarters such as a Theater Communication Zone Headquarters. He must know rations, the types best suited to various tactical situations; he must be sensible in anticipating requirements and tactful in his contacts, for many Quartermaster troubles can arise from the inept functioning of a Class I Division.

f. The Class II and IV Officer can well have had experience in rear echelons, but it is preferable that he also have had field experience with lower units. He must know how to use maintenance factor data, and be able to anticipate Class II and IV requirements for specific types of operations.

g. The Class III Officer who has had commercial experience in fuels and lublicants will find it an asset in developing the knowledge he must have of the use of such products in military vehicles. He should have had field experience in the Combat Zone in order to meet field problems entirely unrelated to those encountered in maneuvers in the United States.

h. Other officers to supervise salvage collection and salvage repair, sterilization and bath units and bakeries, or to serve as assistants to key officers are best drawn into the Office of the Army Quartermaster from Quartermaster units.

i. In the organization of the Quartermaster Service for a field army, nothing can substitute for field service.

··· ORGANIZATION OF ARMY QUARTERMASTER · SECTION ···
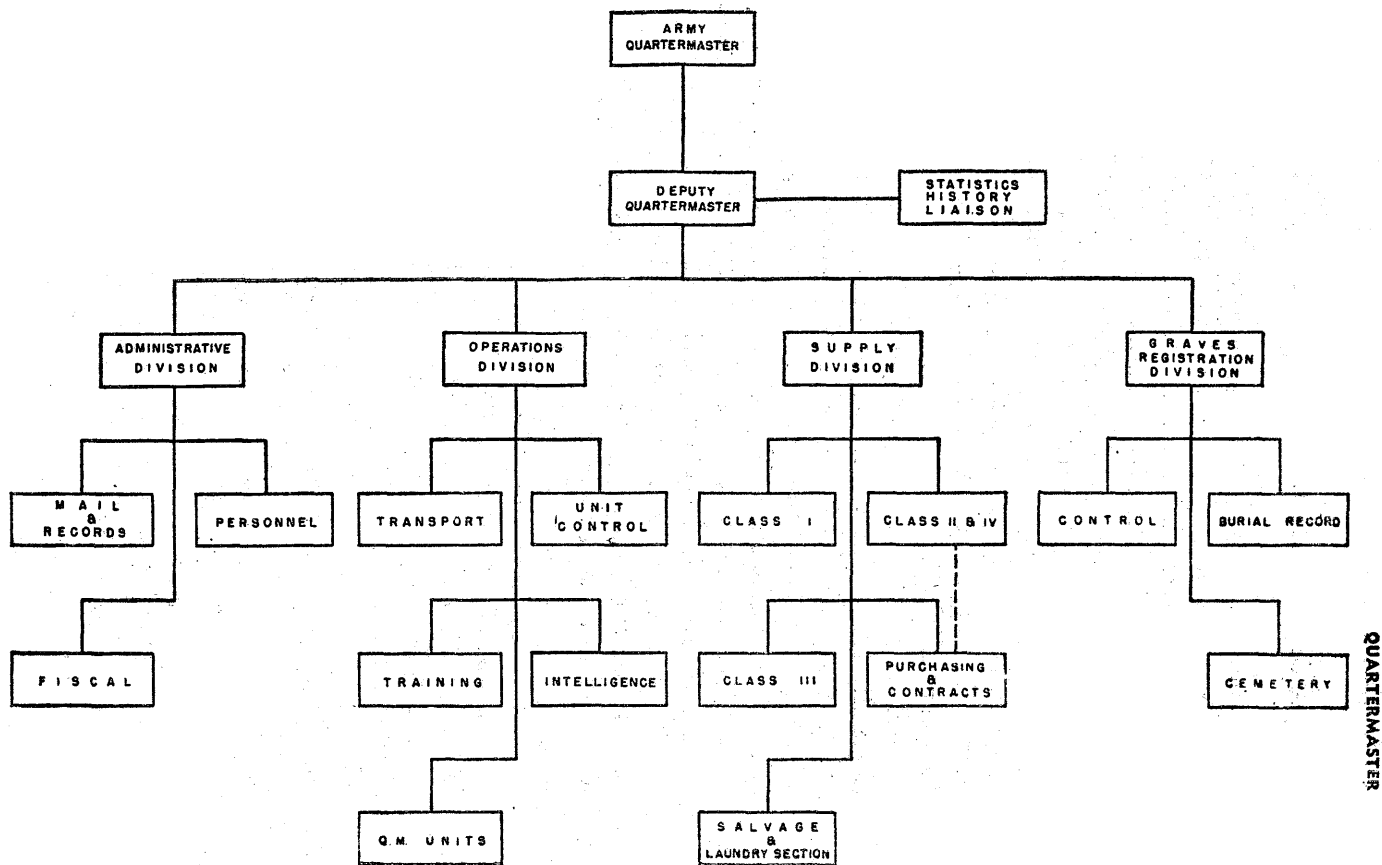
2. Formulation of a Civilian Labor Policy

From the very beginning of the Italian Campaigns, the employment of large numbers of civilians proved necessary to move supplies, maintain lines of communication, and repair materiel. During the early months of the operation the recruiting of civilian labor was haphazard; the various elements of the Fifth Army hired civilians on whatever basis they could manage. Common labor was easy to obtain. Such workers were satisfied with little or no pay, and often labored long hours for the reward of a mere chance to scavenge food at company kitchens.

There was a good deal of competition for skilled labor. As a result, the disparity in wages paid and food provided by military agencies and by civilian employers could have resulted in political and economic unrest. Many essential civilian industries were unable to hold even old employees. As long as no control over them was exercised, some units sometimes exceeded their real needs in employing civilians.

It was soon realized that a definite policy had to be formulated for the hiring of civilians by US forces. The Army Quartermaster was instructed to prepare directives concerning the employment of civilians by all elements of the Fifth Army.

At that time, when the British X Corps and other units were a part of the Fifth Army, a British Increment was included in the Fifth Army Headquarters. The British Army had a fixed civilian labor policy; and an established framework for its administration.

The Army Quartermaster held a series of conferences with the Deputy Assistant Director of Labor of the British Increment and with officials of the Allied Military Government. From these conferences he was able to obtain a guide to the planning of the Fifth Army labor policy and to assure its coordination with the others.

A Labor Officer was designated to serve with the Army Quartermaster to assist him in developing and administering the policy.

As eventually developed, the Fifth Army civilian labor policy set up a systematic procedure for the employment, classification, payment, feeding, and clothing of civilian employees.

Comprehensive job classifications and attendant wage scales were established; they recognized local customs of wage differentials among men, women, and minors.

The hiring of labor was standardized so that all procurement would normally be processed through the Civilian Labor Office or Civil Affairs Officer of the Allied Military Government by formations and units of the Fifth Army. Units hired labor from lists of individuals available under the various job classifications. All individuals listed by the Allied Military Government were previously screened by CIC to avoid as far as possible the employment of subversive characters.

Provision was made for the authorization of feeding either one or three meals a day dependent upon whether the employees were hired for an eight hour day or required to remain on call on the premises twenty-four hours a day.

Allied Force Headquarters established a Labor Committee made up of representatives from all major commands in the Italian theater. Meeting periodically, this board coordinated labor policies and regulated details of administration as need arose.

While the labor policy as developed and administered in Italy did clear up a great deal of the confusion that had existed, it did not provide a complete solution. For example, need for civilian labor often arose in forward areas not yet administered by the Allied Military Government. A division engineer, pressed for help in maintaining roads near the front had to obtain labor as best he could.

The conclusion generally reached by those who had to cope with the civilian labor problem in Italy was that there is needed within the tactical organization of the United Sates Army some provision for the control of a civilian labor program for forward areas through the medium of military field agencies other than Allied Military Government.

3. Retention by Army of Control over Quartermaster Units

At the beginning of the Italian Campaigns there was some decentralization of control over Quartermaster service units. Army relinquished to Corps the control of some railhead, gasoline supply, and service units. Various impediments to the smooth flow of supplies eventually dictated a return to Army of centralized control over all Quartermaster activities.

Poor communications with the Base Section aggravated difficulties arising from the split responsibility for supply within Army. Initially Army was entirely responsible for the shipment of supplies to the various truckheads from Army rear, and Corps was responsible for the location and operation of the truckheads. At times Corps would move truckheads and service units even though poor communications prevented them from advising Army of such moves. Consequently extreme difficulty was experienced in delivering supplies to these truckheads.

It is possible that on a wide front centralization of control might prove impractical, and decentralization to Corps more feasible. In Italy, however, the experience of the Fifth Army favored Army control over all Quartermaster activities.

4. Coordination of Reconnaissance for Dump Sites

The need for coordinating the selection of sites for quartermaster supply installations soon became apparent. Early in the Campaigns, difficulties often arose in selecting sites which could furnish the best service to all concerned because the ideas of division, corps, and Army Quartermaster personnel concerning ideal locations failed to coincide. The right of final decision from a tactical point of view was reserved to corps. As a result of disagreements there was sometimes a considerable delay in setting up dumps.

To correct the situation, joint reconnaissances were conducted by parties made up of representatives from both Corps and Army, especially in locating sites for Class I and Class III installations. This enabled a decision to be made on the spot as to whether a selected site was practical and satisfactory from both tactical and administrative points of view. Such quick decisions provided adequate time for establishing dumps.

5. Use of Quartermaster Battalion Headquarters

Late in 1943, War Department directives reorganized all Quartermaster battalions. Quartermaster companies, formerly organic elements of battalions, became separate companies under new designations and were relieved from permanent assignment to specific battalions. The reorganized battalion headquarters were intended to function in a supervisory capacity over a number of varied types of Quartermaster companies within restricted areas.

The flexibility of assignment permitted by the new organization was not particularly applicable to the situation existing in Italy at that time, partially due to the relatively narrow front of the Fifth Army. It was highly desirable to retain the specialized Quartermaster companies under the supervision of erstwhile similarly specialized battalion headquarters, and thus to utilize to the maximum the specialized experience of the battalion headquarters personnel. Therefore, Fifth Army orders re-assigned all gasoline supply companies to the battalion which had been a gasoline supply battalion; the bakeries to a former bakery battalion; laundry companies and sterilization and bath companies, to a laundry battalion. Service companies returned to their former headquarters.

This policy enabled the delegation of complete responsibility for specialized supply and service. The Class I Division of the Office of the Army Quartermaster, for instance, was relieved of all details concerning the production and supply of bread to the Fifth Army. The battalion commander was

directly responsible to the Army Quartermaster for the super-
vision of all matters of a technical nature; for the allocation
of production requirements; for arranging transportation of
bread from bakeries to ration dumps. In addition, he was
responsible for all administration, supply, and training in the
bakery companies. Other battalions were given the same
responsibilities with respect to their several former
specialities.

During the first months of the Italian Campaign, when the
number of specialized Quartermaster companies was insufficient
to warrant the use of similarly specialized battalions, operation
areas were designated. Supervision over each area was
delegated to the senior Quartermaster officer in the area who
acted as Area Commander. The Area Commander was the
Army Quartermaster's field representative and was responsible
for the coordination of the receipt and transmission of all
orders, reports, and instructions from the Office of the Army
Quartermaster to the various activities in his area. He made
pertinent recommendations to the Quartermaster for the more
efficient operation of installations in the area, including changes
of personnel, where necessary. However, the various separate
units within the area retained their own normal administrative
routine and were not consolidated for such control. This
experience assured the meeting of the contingency of an
expanded front.

Thus, although the tactical situation remained such that
complete use of specialized battalion supervision continued to
be the more practical, there were within the Fifth Army enough
senior Quartermaster officers who had had experience as Area
Commanders that should circumstances have required, the
reestablishment of Quartermaster operational areas could have
been accomplished.

6. Administration and Supply of War Dog Platoons

The Table of Organization of the separate Quartermaster
War Dog platoons, whose animals were used for scouting and

patrolling, and as messengers, provided no administrative personnel or equipment. It contemplated that such functions would be accomplished for the dog units by the tactical units with which they worked.

Within a short time after five such War Dog platoons had joined the Fifth Army it was realized that such a system of administration and supply was impractical under the conditions which prevailed in Italy. As a consequence, all five platoons were assigned to a Quartermaster battalion for administration and supply. The platoons were attached to various tactical units for operations. This corrected the administrative and supply deficiencies.

7. Improvised Equipment in Quartermaster Installations

1. Salvage Repair Equipment

a. *Machine for Cleaning 1-burner Cooking Stove Container.* This machine consisted of a ¼ h.p. gasoline motor, the pulley of which was connected by a belt to two revolving steel brush contrivances. One of the cleaning appliances had two steel wire brushes bolted to a central shaft with bristles facing outward, and one brush placed on the end of the shaft at right angles to the others. This cleaned the interior of the container. The other contrivance had four such brushes bolted to a pulley at right angles with brushes facing inward. This cleaned the exterior of the stove container.

b. *Dipping Tank for Painting Helmets, Intrenching Tools, etc.* This device consisted of a paint tank and a drip trough over which the painted helmet or tool was suspended and excess paint allowed to drip back into the tank. It saved many hours of work and assured an even coating of paint.

c. *Handle Removing Press for Open Socket Tools,* This device consisted of a steel upright frame with a flat steel plate welded to the bottom and an adjustable tool holder at

the top. An ordinary hydraulic automobile jack was set inside the lower part of the frame. Broken tool handles were sawed off close to the head and the tool placed in the press, sawed side down. The jack was raised against the tool, forcing the handle out of the tool.

d. *Handle Removing Clamp for Closed Socket Tools.* A common lumber cant hook was mounted on a steel upright. Rivets holding the handle to the shank of the tool were removed and the handle grasped between the cant hooks. The tool was then knocked away from the handle by tapping with a hammer.

e. *Fitting for Forcing Compressed Air into Canteens, 5-gallon and 55-gallon Gasoline Drums.* Valves taken from Class "D" innertubes were welded to caps of the respective items listed above after holes had been drilled into the caps. Compressed air was forced into these containers to test them for leaks and to force out dents.

f. *Forms for Straightening Mess Gear.* These forms, made of lead and tin alloy, had the reverse shape of the outer part of the gear to be straightened. Dents were hammered out with rubber mallets. The form used in straightening canteens was made in two sections which were hinged together. The canteen was locked into this form and dents removed by means of compressed air which was forced into the canteen through the fitting described in sub-paragraph *e* above.

g. *Electric Cloth Cutter.* A portable electric saw with a 12" circular blade was mounted on a stainless steel base. The saw teeth were filed off and the remaining edge sharpened. This unit, mounted on small casters and fitted with protective guards, was capable of cutting up to forty thicknesses of cloth at one time.

h. *Fire-Unit Gauge and Tube Tester.* The assembly tube from a No. 2 fire-unit conversion set was attached to the filler tube of a fuel tank taken from a salvaged M-1937 fire-unit. An air gauge and an input valve were

attached to either end of the assembly tube. A hose was attached to the fuel output jet on the tank and an air valve was fitted to the free end. The entire device was connected to an air compressor. A gauge to be tested was attached to the air valve on the hose and the valve opened; the gauge was then adjusted to read the same as the gauge attached to the tank. In testing tubes, they were attached to the air valve and other openings were plugged. Leaks showed up under air pressure and so could be marked for brazing.

2. Field Bakery Equipment

a. Bakeries operating American-Century equipment eliminated the use of 64 separate 5-gallon gasoline reservoirs, issued for the operation of the Breese pot-type burner, by installing a 600-gallon gasoline tank outside the bakery and feeding gasoline to the ovens by pipeline. This greatly reduced the fire hazard and saved many feet of linear space along the oven line.

b. Oven exhaust ducts made of powdered-milk cans welded together carried all soot and fumes out of the bakery. This device eliminated one of the major drawbacks, excessive soot, arising from the use of the Breese burner.

c. Enclosed flour sacks beaters, powered by Briggs-Stratton gasoline engines, thoroughly cleaned flour dust from sacks and enabled them to be used for a great variety of purposes in the Fifth Army.

d. The small dough mixers provided as organic equipment proved inadequate to meet bread production requirements. They were replaced by locally purchased civilian mixers powered by jeep motors.

e. In cold weather considerable difficulty was encountered in bakeries operating British mobile equipment in obtaining tempered water for dough mixing from the standard water heater. An auxiliary water heater was built out of salvaged oven burner parts and a 55-gallon gas drum. The heater was fired with fuel oil mixed with air under pressure

provided by the oven blower system. Water was piped from this heater to the tempering tank on the machine trailer.

  f. In the British equipped bakeries a water outlet valve was installed directly above the kneader to permit drawing water direct from the tempering tank thus eliminating the use of the semi-rotary hand pump.

3. Distillation of Dry Cleaning Solvent

  To supplement the laundering operations carried on in connection with the Clothing Exchange and Bath Units, one mobile laundry trailer was converted to serve as a dry-cleaning unit. This conversion was simple; but difficulty was encountered in devising means for recovering the Stoddard's solvent for re-use. After tests had revealed that this solvent could be vaporized, without losing its cleaning properties, a simple still was made of 55-gallon drums and other salvaged materiel. Heat for vaporizing the solvent was obtained from the steam drawn from the laundry trailer.

4. Hauling Eggs and Cured Ham Without Refrigeration

  Non-refrigerated 3½-ton cargo trailers were used to haul eggs and cured ham because the number of refrigerator vans was insufficient to take care of all perishables. No losses occurred when such products were hauled at night or very early in the morning.

5. Portable Break-down Issue Shelves, Class II & IV Depot

  The major item of equipment improvised in the Class II and IV Depots was portable break-down issue shelving. It was so constructed that it could be taken apart easily, moved in one 2½-ton cargo truck and speedily re-erected. Uprights were prefabricated and made to stand independently. By making each upright a separate entity the entire break-down could easily be adapted to any size room or tent. This portable and demountable equipment entirely eliminated the need for complete new construction every time the depot moved.

8. Coordination of United States Army and Foreign Military Systems

A unique supply problem arose when the French Expeditionary Corps became a part of the Fifth Army. Aside from language difficulties which were easily overcome, the problem involved three elements:

  a. Although, under our organization, Army is the administrative control headquarters, in the French Army administrative control is vested in the Corps. Since the French Expeditionary Corps was just another corps in the Fifth Army, Army was responsible for its supply.

  b. The French received some of their supplies through Lend-Lease channels, purchased some of their own ration components from Africa, and received the balance of their rations, individual equipment and clothing (except shoes) from Fifth Army sources. The ration supply was further complicated by the fact that it included 50% more bread than the American ration, as well as wine, brandy and Moslem components.

  c. The French had their own system of supply, manned by their own service troops, most of whom had never served as units in actual operations. Thus the Fifth Army had the responsibility of training the French troops and developing the system to operate efficiently alongside the American supply system.

The first problem was solved by bringing into the Office of the Army Quartermaster an officer of the French Intendence, whose rank and position corresponded to that of a Quartermaster battalion commander. His function was to assist in coordinating the operations of the French and American service units. In addition, several French officers of the French Mission conducted supply liaison somewhat similar to that performed by the British Increment.

Recording and correlation of French supply accounting was accomplished by the use of report forms identical with

429

those used by American forces except that they were printed in French.

After a training period of four or five months during which French and American troops operated French supply installations together, the handling of Class III supplies was turned over to the French altogether. American units at first conducted all operations, then gradually worked French personnel into the systems. The French then also operated their own Class I truck-heads, but American key personnel were retained to supervise records and coordinate procedures.

The key to the successful coordination of the two supply systems was that all individuals concerned, officers and enlisted men alike, exercised diplomacy and tact. The French were made to feel that they themselves were accomplishing the task even though American personnel were leading the way.

As a result of the experience gained in this coordination of two very different supply systems, the Fifth Army Quartermaster later was able more easily to solve the problems of supplying the Brazilian and Italian forces when they became a part of the Fifth Army.

9.   Anzio Beach-head Experiences

The outstanding supply lesson learned as a result of experiences in the Anzio Beach-head was the danger of relying solely on supply by cargo ships in such an operation when there are few or no port facilities. When supplies have to be transferred from cargo ships anchored off-shore to landing craft for lightering to shore, even mildly rough seas can completely interrupt the flow of supplies. Such interruption to the landing of supplies can endure for days at a time; and could cause the failure of an entire operation. The use of LSTs, with supplies bulk loaded, is a far more practical means of delivering supplies. The use of at least some LSTs will offset the danger cited above.

When time is a factor in unloading supplies and getting them issued to the troops, the "B" ration should not be used

in the initial assault supply plan. The "10-in-1", - "5-in-1", "C", or "K" rations are much better suited to rapid handling. The use of the "B" ration should be delayed until a sufficient stock of supplies has been built up and there is sufficient time available to segregate, sort, and warehouse the various "B" ration components.

It is advisable to include a Quartermaster Mobile Laundry Company on the troop list if one or more hospitals are to be included in the operation. Shipping of hospital laundry back to a base installation for processing is impractical because of the time element.

Quartermaster supplies were found to be essentially invulnerable to artillery fire when they were properly dispersed. The only major losses of supplies in the Anzio Beach-head were of gasoline; and then, out of the total supply of gasoline shipped to the beach-head, less than 2% was lost. Losses of rations and Class II and IV supplies were negligible.

10. Modifications of Daily Telegram System in Fifth Army

The daily telegram system as described in standard military texts was inoperable in Italy. It was impossible for forward units to deliver daily telegrams to the Army Quartermaster. Though telephone communication existed, it was often unreliable when distances were even moderately great. It was impractical to funnel daily telegrams through Corps because the same difficulties existed between the units and the corps headquarters. It would have taken days progressively to consolidate daily telegrams from front to rear. In addition, throughout the campaign, the situation was usually so fluid that even had certain units' subsistence requirements been known, there often would have been no information as to where to deliver it. Small units frequently moved from one sector to another on less than 24-hours notice.

In view of the above, the system was modified to provide automatic supply of subsistence to Fifth Army units. Units were not obliged to anticipate requirements several days in advance as they would have been under the orthodox daily telegram system.

Units, when drawing rations, turned in to the truckhead issue office a daily "telegram" which listed unit designation, strength, and quantities of rations by type desired. Rations were issued that day as called for on the "telegram".

At the end of the day's issue three reports were prepared in the truckhead office and sent by courier to the Class I Division of the Office of the Army Quartermaster. The UNIT ISSUE REPORT listed by name the units drawing, together with strengths and types of rations drawn.

This was a control form which enabled the Army Quartermaster to check on over-issues and to detect units which drew supplies from more than one truckhead on the same day. The DAILY REQUIREMENT SHEET listed, by type, the rations which would be required three days later. This latter figure was adjusted by facts concerning probable moves and changes obtained from drawing units. The truckhead commander, knowing what he had on hand, what he expected to receive that day and the next, and what the issue had been that day, was able to maintain a stock level very close to that desired. The third report was compiled by taking the balance of stock on hand the previous day, adding total receipts, and subtracting total issue to obtain a new balance-on-hand figure.

Experience indicated that it was desirable to maintain in truckheads a stock level of 2 days "B", ½ day "C", ¼ day "K", ¼ day "10-in-1", and 5,000 "D" rations. A level of approximately double that was considered desirable in the Army Base Dump.

Each evening a Daily Shipping Order was made up in the Class I office with data taken from the three reports received from each truckhead. It called upon Peninsular Base Section to deliver specific quantities of rations, by types, to the Army Base Dump or Rail Transfer Point three days later. In

preparing the Daily Shipping Order the Class I Division also took into consideration the knowledge it had available concerning the tactical situation.

Bread ingredients were called for on a separate Daily Shipping Order based upon daily consumption as reported by the bakeries.

The system was flexible and excellently adapted to the conditions of limited road and rail nets which existed in Italy.

It was necessary, however, to watch closely the stocks in truckheads, and to anticipate changes in the tactical situation in order to avoid the risk of building up excess stocks. The problem was overcome by leap-frogging truckheads. Information that a truckhead was to close generally was available several days in advance. By stocking the new truckhead in advance of opening and letting the troops eat up the stock of the closing one, a minimum of transportation was required to move the supplies left over.

11. Army Base Dumps and Rail Transfer Points

The physical handing over to Army by Peninsular Base Section of subsistence supplies was accomplished by several methods, depending upon the tactical situation and the availability of transportation facilities. Experience throughout the campaign indicated that either of two fundamental methods was equally satisfactory.

Whenever rail facilities permitted shipment of supplies by that means, a Rail Transfer Point was established. Trains were block loaded, and Army Quartermaster personnel checked the transfer of supplies directly to Army Transportation truck convoys destined for the various ration dumps. Shortages and overages were corrected at a nearby Army Base Dump.

When rail facilities were not available, base section truck transportation delivered subsistence supplies to an Army Base Dump where they were checked, reloaded on Army Transportation trucks, and dispatched to the truckheads.

There were minor variations of both those systems, but in all cases it was found essential to maintain a central control installation for the physical correction of overages and shortages.

12.   Innovations in Fifth Army Class I Truckheads

1. Physical Layout of Truckheads

As a result of trial and error, a standard layout of Class I truckheads was adopted. Conforming as close to the shape of the letter ''U'' as the terrain permitted, layouts of all truckheads were identical in principle. Entrance, with the truckhead issue office close by, was at one end of a direct flow of traffic; exit at the other. This enabled units drawing subsistence to flow through the dump in a steady line past every item of the issue. It avoided all confusion, and even permitted receipt of supplies during issue hours. The trucks of small units used the inside road of the U-shaped dump while those of divisions and large units used the outside.

2. Elimination of Subsistence Salvage Problems

Ever-present in Class I installations was the problem of salvaging loose cans and packages and components in broken cases. In Army Base dumps loose items and broken cases were piled beside stacks of the same items, instead of being hauled to a central pile. A crew constantly toured the dump to pack them in sandbags. The bags were immediately tagged to list items and quantities, and were placed on the top of the stack where they could be issued before unbroken cases. Flour received in 100 lb. sacks, not covered with waterproof paper, was re-sacked in 50 lb. cloth and paper sacks obtained from field bakeries. A special crew re-cased critical items in rebuilt original cases.

In the truckheads, loose items were kept at their proper stacks and were issued first without re-casing or sacking.

3. Soup Kitchens

Vegetable items and some meat items obtained from broken cases of "10-in-1" rations were used to make hot soups served with "C" biscuit to truck drivers and ration truck guards at all truckheads during the winter. It would have been difficult and impractical to salvage these items for issue, and the hot soup was a tremendous morale factor among drivers and guards. Except when truckheads operated all night, dump personnel consumed very little of the soup.

4. Truck Tallies

Whenever any subsistence was hauled between Class I installations, each truck was accompanied by a truck tally signed by the checker at the shipping point and by the truck guard. Shortages were reported to the Class I Division by the receiving installation. Losses on hauls between installations were practically eliminated.

5. Roller Conveyors

Roller conveyors became an indispensable item of equipment in Army Base Dumps and at Rail Transfer Points.

6. Dunnage

Discarded 155 MM howitzer ammunition cases, with the ends bolted back on them made ideal dunnage for subsistence. They were available in practically unlimited quantities, and conformed to all ground contours and stack sizes and shapes.

13. Bakery Equipment—United States vs British Equipment

Experience in the operation of field bakeries using both the American non-mobile and British mobile equipment afforded an opportunity for a comparison of the two. Throughout the campaign bakery companies operated as complete units. Hence the fact that American bakeries were organized so as to enable sections to function separately provided no advantage.

The British mobile bakeries being completely self-reliant on organic vehicles for movement and for transportation of ingredients and finished product; and being 22% more efficient in capacity of pounds of bread per man per day, proved to be the more desirable for operations in Italy.

To operate efficiently the American type bakeries had to procure civilian mixers and power them with jeep motors. The M-42 mixer was too small and too light to enable full capacity bread production.

Some improvisation was necessary in the British equipment, but only because the flow of spare parts from British sources was inadequate.

The experience gained in the operation of the mobile equipment resulted in the submission of recommendations to be considered in development work in the United States on mobile equipment of American manufacture.

14.   Ration Improvements Resulting from Combat Experience

Extensive studies of rations, ration components, and ration packaging were conducted by the Fifth Army Quartermaster. Some of these studies together with reports and recommendations resulting from them were immediately responsible for improvements and changes. Others gave specific direction to development work that had been started. Still other changes, the desirability of which met agreement, were not effected at the time because of shortages of critical materiels and labor.

The elimination from the ''10-in-1'' ration of the ''K'' ration component which served as the noon meal and the substitution of more palatable items quickly followed reports of studies conducted in the Anzio Beach-head. Also arising from Fifth Army studies was the use of only popular brands of cigarettes in gratuitous issues.

The improvement of the ''C'' ration, elimination of certain ''C'' ration components from the ''B'' ration and substitution

therefor of new meat items, the development of the "V-2" container for most ration components, and of the Kitchen Accessory Pack which contains proportionate condiment components for a specific number of men, all were aided by reports of ration studies conducted by the Army Quartermaster.

15. Operation of Cold Storage Plants

Distance and the restricted highway and rail net between Base Section and Army obliged the Army Quartermaster to maintain cold storage facilities for handling perishable items. The number of refrigerator vans available was insufficient to permit their use for any purpose other than transportation.

Quartermaster representatives scouted newly liberated cities to locate cold storage plants that could be restored to operation without extensive repairs. Plants not completely destroyed could usually be quickly put to use provided four major items were available: electric power, anhydrous ammonia, lubricating oil, and non-freezing oil.

In most cases, power presented the most serious problem because the enemy generally damaged generating facilities to a considerable extent. Ammonia generally was difficult to locate. Lubricating oil was easily obtained from Army supplies, but non-freezing oil was rarely available. Ingenuity and diplomacy usually provided some electric power for the cold storage plants and succeeded in obtaining other supplies from civilian sources. A sufficient number of such plants were found, repaired, and operated to meet requirements.

16. Distribution of Class II and IV Supplies through Class I Truckheads

During the first winter campaign there was only one main supply route, Highway 7, available to the Fifth Army. Traffic became so congested on this highway that G-4 was obliged to establish traffic limiting restrictions.

Few of the many trucks that came to the Class II and IV depot ever carried away full loads, and all somewhere along their routes had to use Highway 7. However, ration dumps were so located that units drawing at them had to make little use of the main route, so the Army Quartermaster established a method of distributing Class II and IV supplies at the ration dumps.

Units drawing rations turned in at the truckhead office their requisitions for Class II and IV supplies. The regular daily truckhead courier to the Office of the Army Quartermaster was routed past the Class II and IV depot where he left all requisitions received in the preceding twenty-four hours.

The requisitions were immediately edited, and during the night the supplies were assembled into "packages" which were tagged with the name of the requisitioning unit. The next morning they were shipped to the truckheads and were picked up the following day by the proper units.

This system substantially reduced the number of trucks on the main highways and proved excellent in a stable situation. It later became impractical when the situation became one of rapid movement, and was replaced by a system of Class II and IV sub-depots.

17.   Class II and IV Sub-Depots

In anticipation of the problem of keeping combat units quickly resupplied with essentials in a situation involving rapid movement, a Class II and IV sub-depot system was developed. As the lines moved forward a sub-depot was set up as far forward as possible. This sub-depot was stocked with about 100 tons of Class II and IV supplies, representing four days' essential clothing and equipment for combat troops.

When requisitions were received, items available at the sub-depot were issued and checked off. All requisitions not completely filled were sent by daily courier to the base depot. There supplies were assembled, tagged, and forwarded to the

sub-depot the next day. In addition, the sub-depot was re-stocked daily.

Because of the quantity and nature of its stock, the sub-depot was easily re-stocked, and it was a simple matter to leap-frog sub-depots in order always to keep one close to the consuming units. The sub-depot system was flexible and could be made to conform to any road net.

18. Class II and IV Back-order System

Class II and IV supplies were shipped to Army on the basis of expected consumption, but were issued on actual consumption. Hence shortages were inevitable. The Army Quartermaster developed a back-order system, similar to that used by a large mail-order house in handling orders, to relieve consuming units of paper work.

Items not available, or placed on a priority for issue, were extracted from requisitions and placed on back-order. The back-order book listed, in order of oldest requisition, the name of the requisitioning unit opposite each item.

When supplies reached the Class II and IV depot, the tally-in went first to the back-order department. A clerk, after checking the back-order book, went through the depot and physically picked up items available for issue to clear back-orders. The depot assembled into a "package" the items for each unit concerned.

Units for whom back-ordered supplies were ready were notified by form letter to come to the depot and pick them up.

Army published instructions requiring units to maintain active back-order files, and forbidding the duplication of requisitions for items subject to back-order.

Back-orders could be cancelled only by the requisitioning unit and not by the Class II and IV depot.

19. Suitability of Winter Clothing

All major units of Corps and Divisions were circularized early in February 1945 to obtain a consensus of opinion con-

cerning various items of winter clothing and equipment. Replies were consolidated into the following conclusions.

1. The following items were considered generally satisfactory:

Cap, Field, Cotton, OD, and *Hood for Jacket, Field.*

Gloves, Shell Leather with *Gloves, Insert, Wool.*

Sock, Wool, Cushionsole, as basic sock for Combat Boot.

Sock, Wool, Ski, as basic winter sock for use in Shoepac.

Inner Sole, Felt, except that initial issue to accompany the Shoepac was inadequate. Three pairs per individual, although resulting in considerable increase in the maintenance factor were found necessary. This change was a decided factor in the prevention of trench-foot. Experience of units during the winter indicated that two pairs of innersoles per individual were not enough to insure the availability of a dry pair once the foot had become wet. The increased maintenance was due to the fact that in the drying of these Inner Soles there was considerable shrinkage, and after a number of such dryings, the Inner Sole became useless.

Muffler, Wool.

Sweater, High Neck.

Jacket, Field, Cotton, M-1943.

Jacket, Field, Wool.

Jacket, Field, Pile, except that this garment was somewhat tight in the armpits and across the shoulders. It was preferred to the Jacket, Field, Wool, as both items were not needed during the winter months when the Jacket, Field, Pile was worn. However, the Overcoat, Parka, or the Mackinaw were needed as indicated below.

The combination of *Trousers, Wool, OD,* and *Trousers, Field Cotton,* worn over woollen underwear were satisfactory only generally as far as warmth and appearance were con-

cerned. The combination was not satisfactory for providing the necessary warmth for personnel subject to severe weather conditions. For such personnel *Trousers, Kersey Lined* were more suitable. Within the Division 100% were needed and within supporting troops up to approximately 25% of their strength, for the use of military police, anti-aircraft artillery, OP parties of Field Artillery battalions, and others who had to remain in stationary positions for long periods of time.

2. Not considered essential or required were *Pad, Insulating, Sleeping*; *Tent, Mountain*; and *Mittens, Camouflage*.

3. *Cap, Field, Pile* was suitable during the winter season for all troops who, in the performance of duty were directly exposed to the elements, e.g., infantrymen, artillerymen, vehicle drivers, signal linemen, military police, etc.

4. *Shoepacs* were needed by 100% of Division troops, 90% of Corps troops, and 20% of Army troops; in other words, all combat troops required Shoepacs. The balance of Corps and Army troops, who normally were in a position to change footgear when weather demanded, found overshoes more suitable.

5. *Overcoats, Parka* were required for the use of infantry and artillery observation personnel to an estimated total of 50% of the Division, and for supporting troops in the combat zone who, in the performance of duty, must remain exposed to the elements in a stationary position for long periods of time, e.g., military police, anti-aircraft artillerymen, etc.

6. *Overcoats* were not required for Division or Corps troops who were issued the Overcoat, Parka or Coat, Mackinaw, but were required for all other Division and Corps troops and for all Army troops.

7. *Coat, Mackinaw, OD* was suitable for drivers and mechanics.

8. *Parkas* and *Trousers, Wet Weather* were needed for 40% of the personnel in a Division. These items were also suitable for certain troops in Corps and Army, such as signal linemen, engineers, drivers, and mechanics.

· 9. *Ponchos* were suitable for all troops in the combat zone.

10. *Bag, Sleeping, Wool* would have been more satisfactory if the lower portion were not tapered in width but were of the same width as the upper portion.

11. *Bags, Sleeping, Mountain* were suited for use by all combat troops.

12. *Blankets, Wool* were issued on the basis of 2 or 3 per individual, depending upon weather conditions or the type of Bag, Sleeping issued.

13. The two-piece *Parka* and *Trousers, Camouflage,* similar to Parka and Trousers, Wet Weather, were preferred to the nightshirt type of camouflage garment. Requirements were one suit per individual in the Division area when operations demand.

20. Salvage Collection and Repair Operations in Italy

From the beginning of the Italian Campaign it was the Fifth Army Quartermaster's policy to process and renovate salvaged Quartermaster materiel as far forward in the combat zone as possible. The objective was to keep the maximum quantity of Quartermaster equipment, commensurate with Army needs, within the Army Area. It aimed to keep a continuous supply of equipment available at all times to combat troops and to conserve transportation by holding to a minimum the amount of equipment evacuated from the Army Area and forwarded to it.

The carrying out of this policy posed a particularly complex problem. Technical training manuals and other texts were explicit and detailed concerning salvage operations in the Zone of the Interior, but were vague and general about salvage in the combat zone. In the beginning there were neither standard salvage repair equipment nor Army salvage repair personnel with the Fifth Army. Nor was there ever a really adequate

amount of either during any period of the campaign despite the fact that eventually a Quartermaster Salvage Repair Company was assigned to the Fifth Army.

From October, 1943 until mid-July, 1944 a single Quartermaster Salvage Collecting Company provided the only military personnel available for all salvage operations. This unit had to be used to supervise the repair, as well as the collection and segregation of salvage.

Text books said little more than that salvage collection personnel would scout the battlefield for lost and abandoned equipment. The battlefields of the Fifth Army spread halfway across all of Italy. So field collection had to be limited to scavenging the main roads and hillsides. It was necessary to educate troops to collect the bulk of their own salvage and deliver it to either a Class I truckhead or the salvage depot. This was accomplished by publishing directives, setting up roadside signs after the "Burma Shave" fashion, and by the use of spot announcements on the Army radio. Salvage personnel were assigned to the ration dumps to receive and segregate materiel in preparation for its shipment to the salvage depot.

At first, the salvage collecting company was concerned chiefly with operating the salvage depot and segregating and classifying materiel. It began its repair activities after improvising equipment for repairing mess gear, entrenching tools, and other metal equipage.

Mobile field range inspection and repair groups and a mobile typewriter unit were initially under control of a non-salvage unit; shoe repair was conducted at the Class II and IV depot. Clothing repair was initially a function of the Quartermaster Purchasing and Contracting Section. Woollen shirts, trousers, underwear, etc. were parcelled out to contract tailors who farmed bundles out to housewives. However, the sanitary conditions in some homes where work was done were unsatisfactory. Lice were discovered in finished bundles. Adequate control and supervision over this system being impractical, it was abandoned.

Gradually all salvage repair activities were turned over to the salvage collecting company for supervision. In July, 1944, when the salvage repair company joined the Fifth Army, the operations of the two companies were coordinated under a single Salvage Officer. Civilian labor and local resources were exploited to the utmost; as many as 1200 seamstresses and tailors were employed in the Salvage depot.

Mobile repair units for stove fire-units, typewriters and shoes were developed in order to take repair service to the combat troops whenever possible, rather than to require them to bring their work to the central shops.

Quartermaster materiel which could not be processed in the Army salvage repair installation was shipped to PBS where it was exchanged for equal quantities of serviceable equipment of the same type.

Over thirty million dollars worth of salvage materiel was completely processed and returned to use by the Army in little over a year's operation.

By accomplishing this work within the Army Area instead of shipping all salvage to Base and back again,several hundred thousand truck miles were saved in this same period. A vast saving in shipping space and time was also gained.

The advantages gained by having the materiel processed through salvage operations conducted in the Army Area when need for it was critical, proved the effectiveness of this system.

21.   Mobile Field Range Inspection and Repair Group

Developed by the Fifth Army Quartermaster and operated under his direct control was a mobile Field Range Inspection and Repair Group. The function of this unit was to go out into the field directly to unit kitchens, and there inspect field ranges and fire units, and make any repairs found necessary. To supplement this service, members of the unit gave operation and maintenance instruction to all kitchen personnel.

In Italy this group operated primarily within divisions. Some corps and army troops were served.

A 2½ ton cargo truck was remodelled to convert it to use as a shop truck. It was fitted with the necessary equipment and tools, and stocked with spare parts. An additional stock of maintenance parts and tools was carried in order to replenish tool kits in the kitchens visited. The unit was manned by experienced fire-unit mechanics.

When the idea had been tested and found satisfactory a second truck was added. This was an Ordnance shop truck, M-7, small arms.

Division Quartermasters were unanimous in their praise of this service and expressed desire that it be made available to them at regular periods.

The operation of the Field Range Inspection and Repair Group over a period of more than a year resulted in the following conclusions:

a. It performed a definitely useful function with an army in the field. All kitchen personnel received greatly needed instruction in fire-unit operation and maintenance.

b. It operated at greatest efficiency with divisions because it could cover the greatest number of kitchens in a given time. Corps and army units could be served when divisions were engaged and at other opportune times.

c. The repair group worked best when the division was out of the lines in a rest area. Then the two-truck team could cover the division kitchens in approximately two weeks time.

d. The fact that throughout the period of its operation the group made repairs on about 70% of the fire units inspected indicated a need for closer maintenance supervision.

e. Regular visits of such a group eliminated undue wear on field range equipment and thus decreased the demand on the supply system for parts and complete replacement units.

f. The data compiled from the reports of such a group provided factual figures for requisitioning spare parts and

tools. It was possible to present definite experience data to support demands when the need for apparenthy excessive quantities of tools and parts was questioned.

The work of fire-unit and field range repair shops of Salvage Repair Companies was supplemented and eased by the operation of the Mobile Field Range Inspection and Repair Group.

22. Mobile Typewriter Repair Shop

Two typewriter mechanics serving under the Fifth Army Quartermaster were assigned to operate a mobile repair shop mounted on a 1½ ton truck chassis. The shop was equipped to make all types of repairs to typewriters, adding machines, and other business machines. This unit supplemented typewriter repair facilities operated in conjunction with salvage repair activities.

The routing of the mobile typewriter repair shop generally coincided with that of the mobile field range inspection and repair group; it worked directly within the division areas. Thus all machines within the divisions were cleaned, adjusted, and repaired close to where they were used.

While the work of this unit did not eliminate the need for maintaining a central typewriter repair shop, it kept machines in better maintenance and reduced the time that would have been lost in bringing many to the central shop and leaving them there for repair.

23. Clothing Exchange and Bath Units

Experiments were conducted as to ways and means of providing combat troops with facilities for a hot shower and a complete change of clothing well forward in the combat zone. As eventually developed and perfected, the operation of Quartermaster Clothing Exchange and Bath Units became one of the outstanding morale factors during the war in Italy.

Normally, a Quartermaster Sterilization and Bath Company was intended to be established well to the rear of the Army Area. Its purpose was to provide facilities to which a unit

known to be infected with body insects could be brought, and the men given an opportunity to bathe while their clothing was being sterilized. The first experimental set-up, which soon evolved into the Quartermaster Clothing Exchange and Bath Unit, consisted of one platoon of a Sterilization and Bath Company and one platoon of a Mobile Laundry Company. These units, after several months of operational experience, were capable of bathing and reclothing three hundred men an hour. Each man processed was provided with soap, a clean sterilized towel, and a complete change of clothing except for shoes and headgear. The clean clothing, other than socks, was issued in small, medium, and large sizes after experience had revealed the impracticability of exchange in exact sizes. Socks, because of their importance in foot care, were issued by size. All old clothing was sterilized, especially the bath towels which men finally used to dry their feet, in order to safeguard the health of the troops. Wool shirts were sterilized after laundering because sterilization before laundering set the body oils which accumulated on collars and cuffs. Improvized dry cleaning equipment was used to clean oily and greasy garments.

Generally these units were centrally located in areas of greatest troop concentrations. Whenever a division came out of the lines and went into a rest area a Clothing Exchange and Bath Unit was set up in that area. Unit commanders had only to arrange schedules with the Clothing Exchange and Bath Unit commander. Combat troops out of the line for rest were given priority over all other troops until each man had received an initial bath and change of clothing. Because of the irregular working hours of service units which precluded definite schedules, their men were infiltrated along with scheduled units unless the scheduled unit was a large one. Night schedules were arranged only under exceptional circumstances.

Two major supplementary services were offered Fifth Army troops in addition to the standard operation of the Clothing Exchange and Bath Units.

During the winter months while the Fifth Army was engaged in the mountains north of the Arno River, the area in

and about the resort town of Montecatini was established as a large rest center. One of the facilities requisitioned for Fifth Army use in Montecatini was a large public bath house. This was operated under the supervision of Sterilization and Bath Company personnel who also provided a clothing exchange set-up.

Divisions whose units had been issued portable field bathing equipment were provided with an initial stock of clothing so that they could themselves make a direct clothing· exchange. The laundering and cleaning of soiled clothing was handled through the Quartermaster battalion headquarters which supervised all Clothing Exchange and Bath Units. Such divisions made a direct exchange of soiled clothing for clean clothing.

Direct exchanges were made through the Quartermaster Salvage Depot to replace unserviceable garments.

The Cleaver-Brooks Portable Field Bath Unit, part of the equipment of a Fumigation and Bath Company, was used successfully in the Clothing Exchange and Bath Unit as a substitute for two Sterilization and Bath trailers.

The complete success of this method, and its great value to combat troops, indicated the desirability of establishing the Clothing Exchange and Bath Unit as a standard unit in the United States Army.

24. Remount Problems

Early in the campaign, there developed an urgent need for pack trains. The organization of pack units of Italian military personnel developed slowly, due to the disorganized state of the Italian Army. Divisions, therefore, organized provisional units from their own personnel, and used them until such time as the organization of the Italian units permitted their disbandment.

A remount depot was organized with personnel selected from Quartermaster Service Companies. Horses and mules were obtained from Sicily, Sardinia, and Corsica as well as from southern Italy. Many of the animals were in poor condition and were badly infested with lice. Rehabilitation of these

animals was necessary before they were fit for use. White and grey animals were sprayed with a 5% solution of potassium permanganate to darken them. The expedient was practical and the animals showed no obvious ill effects.

U.S. pack saddles were too large to fit the Italian mules, so complete reliance had to be placed on local procurement. Supplies of all pack equipment from both civilian and military sources were inadequate and had to be supplemented by local manufacture and improvisation.

25. Gasoline Supply

1. Gasoline Dispensing

Gasoline was delivered to Army in three principal ways: by pipeline, in tank trucks, and in 55-gallon drums. This caused the problem of gasoline supply in the field to become one of breaking down the bulk supply into easily handled containers.

Quartermaster Gasoline Supply Companies assigned to the Fifth Army, because of shortages of equipment and numbers of units, were obliged to improvise means of increasing their daily dispensing capacity in order to meet requirements.

The system eventually developed provided for reception of gasoline by any method. If pipeline construction had reached a Class III installation it was connected directly to the dispensing system. Tankers also discharged their loads directly into the feeder mains. Cargo trucks laden with 55-gallon drums backed up ramps to dumping vats where several drums were emptied at a time.

All receiving points were connected by a 4-inch main to a 350-gallon-per-minute pump which fed two or more 4-inch mains. At intervals of 110 feet along these mains were smaller service lines which branched out to either side. Each service line terminated in a dispensing hose fitted with a spring valve nozzle. 5-gallon cans or 55-gallon drums were filled from these

hoses while unit organic tankers were filled from a fitting at the end of the main.

This system enabled canning 250,000 gallons of gasoline a day. Entirely dismountable and portable, the material used in it was hauled in three 2½ ton cargo trucks.

2. Roadside Gasoline Stations

Whenever the tactical situation permitted, the Army Quartermaster set up portable gasoline stations at points along main highway routes. All military personnel were encouraged to use these stations, and all authorized military vehicles were served. Only gasoline was dispensed; no oil, air, or other conveniences. Reservoirs at these stations normally were captured German tanks set about ten feet off the ground. Filled from tankers, the reservoirs fed gasoline by gravity.

3. Unloading 55-gallon Drums from DUKWs

At Salerno and at Anzio gasoline was delivered to the dumps in 55-gallon drums by DUKWs. To ease and speed up unloading, and to eliminate the personal danger involved in lifting full drums up and over the side of the DUKW, an A-frame was bolted to the front end of a winch-equipped truck. By using a sling attached to the winch cable, one man and the winch-truck driver easily and safely unloaded a DUKW in about fifteen minutes.

4. Gasoline Can Washing

Despite every effort to prevent it, dirty gas cans were an ever-present problem. A can washer was improvised and all empty cans received at the dump were flushed. The washer used a pressure pump to force gasoline into inverted cans through a spray nozzle. The same gasoline was used over and over, flowing from the washer trough through sediment cans, and back through the pump.

5. Fire Fighting

The foam type fire extinguisher proved somewhat unsatisfactory for fighting fires in stacks of canned gasoline and drums. The foam had a tendency to remain on top of the

stacks and failed to filter down to smother fire close to the ground. Mud and water proved more effective.

To obtain maximum dispersion, dump areas were computed on a basis of two square yards of surface per gallon of gasoline capacity.

Gas drums were stood bung end up when afire after it was found that when on their sides the ends often blew out with great force, throwing flaming gasoline a considerable distance.

When gasoline dumps were established where they were under artillery fire, dirt was pushed up around the stacks with a bull-dozer. If time permitted, pits were dug and containers placed therein.

26. Graves Registration Procedures

1. General

The paucity of technical and training materiel concerning field operations hampered Graves Registration personnel just as it did the other Quartermaster services in developing their operations to fit the policies and tactical situation which governed the conduct of the Italian Campaign. The Table of Organization of a Graves Registration Company contemplated the attachment of a company to a corps, with three platoons serving divisions and one serving corps. During a great part of the campaign, however, only one such company was available to the Fifth Army which comprised two corps of US troops. Because of these factors, the Fifth Army Graves Registration Service of necessity developed innovations in both field operations and office procedure.

2. Field Operations

Few divisional cemeteries were established in Italy. Instead, extensive use was made of graves registration collecting points which were always kept well forward behind various major elements of the Fifth Army. Their value was quickly recognized when units had become accustomed to their

use. The use of larger corps or sector cemeteries supplanting numerous division cemeteries provided much more efficient operation.

Starting in the collecting points, the greatest possible emphasis was placed upon identification of the dead. There, primary search for identification was made. Vehicles used for evacuating the dead were held until this primary search was completed. Then, if additional evidence of identification was required on any body, request was made directly to the evacuating unit for further possible information.

Every effort was made to ascertain the exact place of death. In cases of unidentified dead, close grid coordinates were obtained to facilitate identification search through units known to have been in the vicinity.

Personal identification of a body was accepted as conclusive, provided the associate of the deceased had known him over a reasonable period or time.

When a body reached the cemetery still unidentified, anatomical descriptions, clothing sizes, and laundry marks or other inscriptions on the clothing, as well as fingerprints and dental charts were recorded. Clothing stripped from long-exposed bodies usually had to be washed in order to make markings legible. If laundry markings or initials were obtained from garments removed from the body, they were accepted as clues upon which to initiate an investigation.

The principle of unit evacuation to the graves registration collecting points proved very successful in Italy. It resulted in quick recovery of bodies by units generally familiar with the circumstances and place of death, and this greatly increased the likelihood of definite identification. This procedure avoided long exposure of bodies to the elements with resultant preservation of evidence of identity. It enabled graves registration companies to operate cemeteries efficiently and to conduct their task with compassion and dignity.

Despite the fact that the use of temporary grave markers is prescribed, Crosses and Stars of David were erected in United States Military Cemeteries even in the combat

zone in compliance with the desires of Fifth Army Commanders.

3. Office Procedures

The Graves Registration Division was constituted as a major element in the Office of the Army Quartermaster. It so elaborated and specialized its procedures that it was able to establish the record of having secured identification in 98.5% of all American dead buried by Fifth Army personnel. It obtained evidence which may lead to the identification of many still unidentified.

Whenever possible, substantiating evidence to support identification tags, in the form of letters, identification bracelets, social security cards, statements of personal identification, etc., was required to be recorded in the report of burial.

Every report of burial was reviewed thoroughly to insure that only correct reports would be forwarded. All reports of burial of unidentified dead, or of those of whose identity there was any doubt whatsoever were withdrawn, and correspondence was initiated in effort to establish, corroborate, or substantiate the identification. Such correspondence sometimes required numerous indorsements before reports were complete.

The complete correspondence corroborating indentification or serving as a basis for the establishment of an identity was attached to each copy of the Report of Burial in order that the War Department and every headquarters concerned might have a complete document.

Tentative identifications of unknowns were based on circumstantial evidence, contained in correspondence or other documents and identity was specifically indicated as tentative, with the possibility of later being made definite as a result of review of the evidence in higher headquarters.

Divisions known to have been in an area from which an unidentified body was recovered were canvassed. Clues to

identity found on the remains were presented in order that division personnel sections could compare information concerning the unidentified remains with casualty and personnel records. The exact place of death, as shown on the report of interment was the key point in the initiation of such investigations.

The filing of reports of burial of unidentified dead according to grid coordinates of the place of death was an important innovation in the Fifth Army Graves Registration Service. This facilitated comparison with casualty statements, and in many cases led to the establishment of identity.

Close liaison with the AG Battle Casualty Section was maintained to coordinate casualty and burial information. This, together with the rapid recovery, early identification and burial of the dead resulted in changing the casualty status of many Missing In Actions to Killed In Actions.

Close liaison was developed with the Air Corps to obtain casualty information pertaining to plane crashes discovered in the Army Area. A comparison of the investigation made at the scene of the crash by graves registration personnel with the information contained in the casualty statement resulted in the identification of many Air Corps dead that would otherwise have been interred as unknown.

The thorough and efficient manner in which Graves Registration Service was conducted in Italy was of tremendous morale value to combat troops and undoubtedly to all on the home front. American troops could not help but gain spiritual peace of mind from the sight of the well kept and dignified United States Military Cemeteries.

Chapter Eleven

TRANSPORTATION

TRANSPORTATION

1. Development and Organization of the Fifth Army Transportation Section

The advent of the Fifth Army in Italy provided decidedly new problems in every military field; transportation was beset with its share of these problems. The geography of Italy provided only a limited highway net and the enemy had been most thorough in his demolitions of the existing rail lines. These two factors, coupled with the unprecedented expenditure of ammunition and other supplies and the limited Army truck cargo lift, dictated the establishment of a centralized control of all non-organic transportation, and road movements, rails and railheads as developed, with a coordinated liaison with beach and port agencies.

Since there was no Army Transportation Section provided in the Army T/O, it was necessary to improvise such a section. Personnel and equipment were provided, based on the then current and anticipated problems.

Under the Army Transportation Officer, operating subdivisions were formed, with a Freight Division to handle the movement of all Army supplies, salvage, or troops, and evacuations by truck, rail or water; a Movement Control Division to regulate and control all movements over army roads; and a Traffic Engineer Division to survey new road nets, plan circulation, devise and request road improvements, and to sign all main routes using a standard system.

Expanding from that rudimentary basis, the Transportation Section, Fifth Army, became a seventh Special Staff Section of the Army Headquarters, and successfully supplied and coordinated the movements of the entire Fifth Army from one end of Italy to the other.

The organization of the Transportation Section as a Special Staff Section was a decided departure from the normal

make-up of an army headquarters. However, the Army Commander, realizing the important functions of this section in the channels of supply, and the number of personnel and the quantities of equipment under its command, decided that this step was merited and essential. Its performance proved the necessity of incorporating a Transportation Section in an Army Headquarters T/O and providing the necessary operating units for carrying out the functions of controlling motor transport in the army zone of action.

Charts I and II portray the Transportation Section, showing the composite sections, together with the necessary attached units, required to provide complete coverage of Transportation's responsibilities.

The Traffic Regulation Group provided trained officer and enlisted personnel for the operating sections, including personnel for field installations of TCP's, sub freight officers at railheads etc., together with administrative personnel necessary for normal billeting, messing, and headquarters functioning.

The attached Signal Operating Company provided all necessary signal service (telephonic, radio, teletype and messenger) necessary for operations.

The attached Military Police Company provided guards necessary for covering movements of pilferable items on transportation freight convoys.

The QM Truck Group, with its attached truck battalions, provided the required lift necessary for freight operations.

The Italian Labor Battalion provided necessary labor for railhead or truck transfer points, as required in freight operations.

CHART I

OPERATIONS CHART

TRANSPORTATION SECTION - FIFTH ARMY
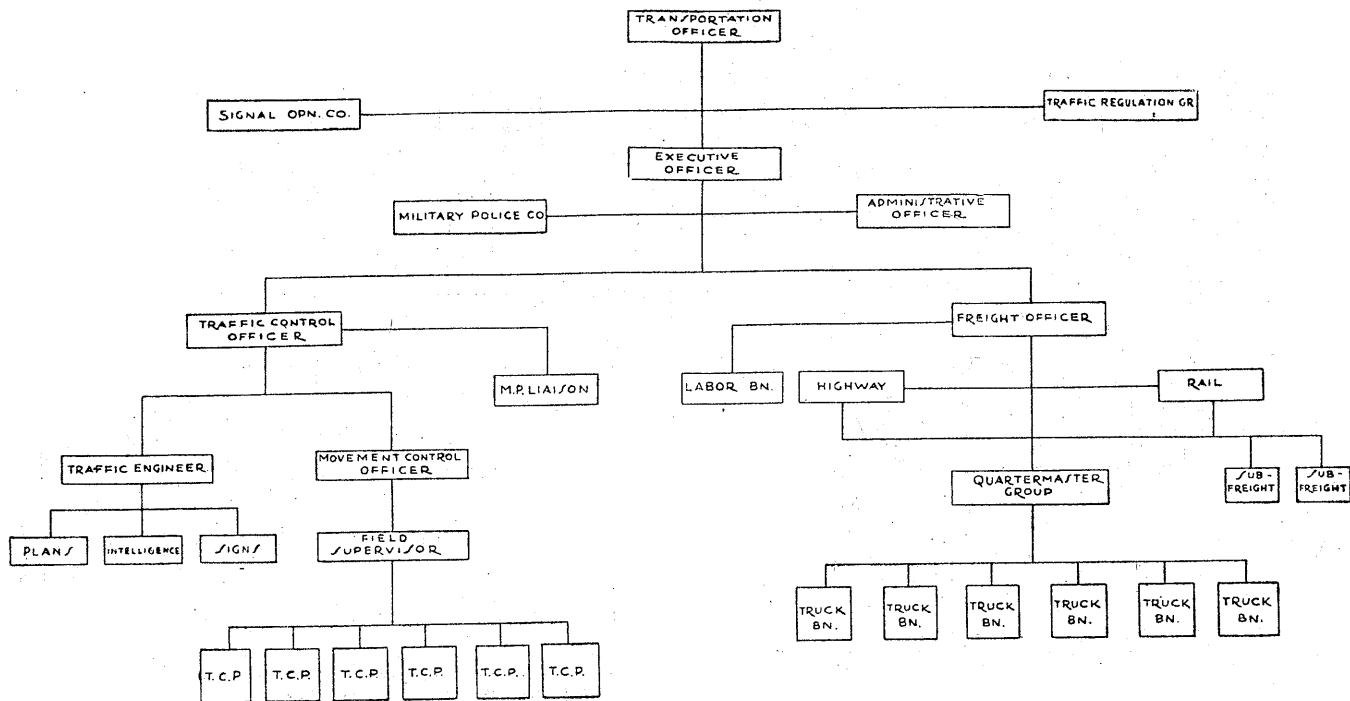
CHART II

ADMINISTRATIVE COMMAND TRANSPORTATION SECTION - FIFTH ARMY

TRANSPORTATION SECTION

ASSIGNED OR ATTACHED

```
                        TRANSPORTATION
                            OFFICER
                          1   E.M.

                         EXECUTIVE
                          OFFICER

    TRAFFIC CONTROL              FREIGHT           ADMINISTRATIVE
        OFFICER                  OFFICER               OFFICER
                                                      3   E.M.
    ASST. TRAFFIC             ASST FREIGHT
    CONTROL OFF.                OFFICER
      5  E.M.                   5  E.M.
```

SIGNAL ODNS. CO.	TRAFFIC REGULATION GR.	LABOR BN.	QUARTERMASTER GROUP	M.P. CO.
7 OFF. 2 W.O. 245 E.M.	22 OFF. 175 E.M.	25 OFF. 557 E.M.	10 OFF. 21 E.M.	4 OFF. 93 E.M.

TRUCK BN. ⊙	TRUCK BN. †	TRUCK BN. † *	TRUCK BN. † *	TRUCK BN. † *	TRUCK BN. † \\
24 OFF. 2 W.O. 537 E.M.	29 OFF. 2 W.O. 618 E.M.	29 OFF. 2 W.O. 666 E.M.	29 OFF. 2 W.O. 666 E.M.	29 OFF. 2 W.O. 666 E.M.	29 OFF. 2 W.O. 666 E.M.

——— ASSIGNED UNITS.

- - - - ATTACHED UNITS

⊙ FOUR COMPANIES PER BATTALION.

† FIVE COMPANIES PER BATTALION.

* INCLUDES ONE 24 MAN DRIVER AUGMENTATION TEAM PER CO.

\\ DRIVER AUGMENTATION TEAM AUTHORIZED FOR THREE COS ONLY.

2. Policies of the Transportation Section

The following policies were developed and followed in the Italian campaign and proved to be practical and sound.

1. Centralized Control

Within the army area, the Transportation Section retained centralized control of all available transport and lift other than organic; railheads within the army area were under army control, and were operated by army with labor attached to Transportation for that purpose; further, the Transportation Section exercised central control over road movements within the army area.

Transportation's centralized control included authority over manner and time of shipment of supplies to army by base, since rate of reception was the critical factor rather than rate of shipment.

2. Other Nationals

It was essential that transport facilities and control personnel attached to Corps of other nationals be pooled under the Army Transportation Section for the performance of third (or army) echelon transportation, offsetting the tendency of Corps of other nationals to establish separate transportation echelons at army levels.

3. Depot Levels and Supply

Since transportation flexibility and efficiency depends largely upon relief from the necessity of moving large dumps forward as army advances, it was necessary for the services to maintain low levels in forward truckheads and to hold main reserves in or near port or railhead areas. The lowest possible levels, consistent with insurance of adequate supply, were maintained in army base dumps.

In so far as possible, supplies in army base dumps were kept static, as a reserve, and maintenance supplies for forward truckheads were loaded direct to truckhead by rail-army truck combination, or base truck-army truck combination.

461

The latter combination was set up by mutual agreement on a basis of the normal ton-mile obligations of base and army which would have applied if base had hauled only to army rear and army to forward truckheads.

3. Location of the Army Transportation Section

Transportation Section, Fifth Army, although a Special Staff Section of the Army Headquarters, was seldom located physically or geographically in the immediate vicinity of either of the Army echelons. The most important reason was the necessity for close association with its operating agencies, which, in turn, for reasons of economy and efficiency were located near the sources of supply. These sources were the railheads, truckheads, and port facilities. Another factor largely dictating the Section's location was the desirability of locating it somewhat centrally in relation to the road network over which it exercised control of freight movements and traffic circulation.

4. Truck Group Control

Normally over a thousand cargo vehicles are assigned to an Army in the field for the lift of army supplies. In the Fifth Army these vehicles were assigned to and operated under the Transportation Officer.

To facilitate control, the several truck battalions assigned were combined under a central "Truck Group Headquarters". This headquarters maintained administrative control of the group. It also supervised the training of all truck unit personnel in order to insure coordinated, efficient, and standardized operations.

The Truck Group Headquarters had as a part of its staff one of more well qualified experts on motor maintenance to supervise the operation of this important function within the truck battalions and companies.

5. *Transportation Road Patrols*

At times of heavy movement, every possible expedient was utilized to assure an uninterrupted flow of traffic. Two of the most important expedients were the "Company Commander Patrol" and the "Wrecker Patrol", both maintained and operated by Transportation's Truck Group Headquarters.

A Truck Company Commander, with one or two of his mechanics and with tools and equipment, was assigned to patrol a section of road. This patrol checked convoy stragglers, assisted in minor repairs, gave directional information whenever required, checked convoy reception and handling in the dumps, and in general kept transportation convoys moving. It reported frequently to the Freight and Movement Control Divisions on the progress of freight and movements.

In addition to the heavy wreckers stationed at each of the Traffic Control Posts, wreckers, from units assigned to Transportation, patrolled specific sections of the roadnet at a minimum interval of six hours, effecting and assisting in minor repairs, and when necessary clearing the road of stalled vehicles, wrecks, and roadblocks.

Upon determining that a loaded vehicle would not be able to proceed to destination under its own power, either of the patrols above, would, after removing it from the road, immediately notify the driver's unit. If the truck were near its destination, another truck of the convoy was recalled when unloaded and the load transferred from the disabled vehicle. If this were not possible, the parent unit would immediately dispatch another truck, with sufficient labor to transfer the load, and the unit wrecker to haul in the disabled truck.

6. *Feeding Stations*

Rapid advances during several periods of the Italian Campaigns resulted in extremely long lines of supply. Because of this, freight convoys of the Transportation Section were on the road for periods of from twenty to twenty-four hours, and driver fatigue became a dangerous factor.

To combat this danger, rest halts were scheduled, but this did not fully solve the problem. ''Feeding Stations'' were set up at the far end of freight routes to provide hot meals for Army freight convoy drivers at any time of the day or night. This broke the driver's almost continual diet of cold rations, bolstered his morale, noticeably decreased his fatigue, and thereby reduced accidents.

7.   Transport—Maintenance

Maintenance of vehicles must be highly organized and rigidly pursued to reduce deadline and grounding.

This problem in the Fifth Army with respect to the vehicles under control of the Transportation Section was met primarily by strict supervision of pre-planned maintenance and strict mechanical training of mechanics and drivers under the direction of the Group Motor Maintenance Officer, and secondly by the provision of two Ordnance Medium Maintenance Companies for maintenance support.

It was made clear to all transport personnel that maintenance is a command function, and that this responsibility passes down without diminution to Truck Company Commanders, Motor Officers, Convoy Commanders, Platoon Sergeants, and last and most important, to each truck driver.

However, the effective functioning of maintenance operations depended largely on the efficiency of the truck company Motor Officer.

The duties of this officer were prescribed as follows:

    a. To arrange, within his company area, a satisfactory motor park, with adequate protection against fire and other hazards; with facilities for keeping parts and equipment in good condition; and with two or more grease pits for normal maintenance and for a thorough check of each vehicle after each run.

    b. To devote his entire time to vehicle maintenance, organizing and supervising the work performed by the motor sergeant and mechanics.

464

c. To maintain and secure required parts.

d. To keep a constant workload of four trucks deadlined for first and second echelon maintenance. (These trucks were completely checked and corrected and given either a 1000-mile or 6000-mile check, whichever was applicable.)

e. To contact the Ordnance unit servicing his company and work with the unit in accordance with existing standard operating procedure of such unit.

f. To maintain a truck duty roster, posting the following: mileage each day, 1000-mile checks, 6000-mile checks, third echelon repairs, and first and second echelon repairs.

g. To establish and maintain stock records in accordance with instructions set down by the Truck Group Headquarters.

h. To submit a daily availability report as of 0600 hours to Truck Group Headquarters, indicating number of trucks on first and second echelon maintenance, number in ordnance, date entered and date of probable release, number tallied in with date of tally, and the number of trucks on detached service.

i. To emphasize, in addition to their mechanical condition, the appearance of his vehicles, and the care of their tools and accessories.

A daily bulletin published by the Truck Group Headquarters to its command indicated the percentage status of truck availability for the Battalions with the group; a like publication within the battalions depicted the company percentages. These publications promoted a keen competitive spirit among all units, developed appreciably higher standards, and maintained greater effort toward perfection.

8.   Permissible Loads on 2½ ton 6×6 Cargo Truck

Limited lift availability in the Italian Theater dictated that all transport be loaded to its maximum capacity without causing damage to the vehicle.

465

Tests were conducted and it was determined that the 2½ Ton, 6 x 6, Cargo Truck, when properly loaded and operating on roads (not cross country), will lift five tons without substantially increasing maintenance.

"Load Charts" were prepared, using a weight maximum of five tons or, with light bulky commodities, the cubic capacity as limiting factors.

Examples: 5 Tons Ammunition (other than powder increments)
3,750 lbs. Bread
1½ Tons Hay
3 Tons Grain
1100 Gal. Gasoline in 5 gal. cans.
990 Gal. Gasoline in 55 gal. drums

9.   Use of the one-ton Trailer

Tables of Equipment provided, within the QM Truck Companies attached to Transportation, a "Trailer, one-ton, two wheel" with each of the supply vehicles allowed. This would theoretically provide an additional one-ton lift for each movement of the truck.

The mountainous road conditions and the generally rocky or muddy dump conditions presented difficulties in loading, unloading, and maneuvering the truck with trailer attached, which rendered impractical the use of this trailer in the normal movement of supplies. By test it was determined that the efficiency and acceleration of movement of the truck without the trailer outweighed the additional tonnage gained by use of the trailers in supply movement. Another factor affecting this balance was the fact that we loaded to five tons all classes of supply which could cube such a weight in the 2½ton truck.

10.   Transport—Special Equipment

The "Truck, cargo, 2½-ton, 6 x 6, LWB" was proven a most efficient general purpose vehicle for cargo lift. However, the Transportation Section received many transportation

orders for "Special Lift" of items or materiel, the weight or dimensions of which prohibited their being loaded on a 2½-ton truck.

To meet this problem, the Transportation Section requested and received the following equipment then available from Theater Stocks:

a. A company of 4-ton, 6 x 6, cargo trucks, capable of lifting 8 tons or towing a 16 to 20 ton load.

b. Several 16 ton Engineer trailers, suitable for handling large pieces of equipment, long timbers, etc.

c. A platoon of tractors, 1½-ton, 4 x 4, with trailers 6-ton, flat bed, stake body, suitable for handling light bulk items such as baled straw, gasoline in cans or drums, baled or crated clothing, etc.

In addition to controlling the above mentioned equipment, the Transportation Section also maintained close liaison with organic units possessing heavy tank transporters capable of carrying 40 to 50 tons. Should a transportation order call for such a heavy lift, the Ordnance unit furnished the vehicle, and the lift was made on a Freight Division Dispatch.

11. Transport—Heavy Lift Equipment

Experiences in Transportation operation throughout the Italian Campaigns indicated that a combination of 2½ ton truck companies and companies equipped with heavy trucks would provide the most efficient supply support to the Fifth Army, i.e. it would more quickly and economically move greater tonnages, and still meet the varied conditions and problems of terrain, roads and weather that might arise.

In keeping with this premise, one truck battalion of five companies was re-equipped with the tractor, 5-ton, 4 x 4, with trailers 10-ton, flat bed, stake body.

The characteristics of the 10-ton trailers made them admirably adaptable to many diversified loads, and, too, they provided an average lift on a ratio of three-to-one over the 2½ ton truck. The necessity for maneuverability and high power

in relation to load in Army area made the retention of a sub-
stantial number of 2½ ton 6 x 6 trucks necessary.

Specific features in the use of the 10-ton trailer were:

    a. In level country, the use of "dollies" permitted the
tow of a second trailer, and thus a double load.

    b. Issue of additional trailers, on a ratio of approxi-
mately three trailers to each two tractors provided a constant
flow of supplies between two fixed points, with tractors running
continuously - one trailer running, one loading, and the third
unloading at the same time.

    c. The bodies of the trailers were easily adapted to
side loading and unloading, and when sufficient labor was avail-
able, the trailers were loaded or unloaded in the same time
required for a 2½ ton truck, since men could work at both sides
and in the rear of the trailer at the same time.

    d. Average running speed through mountainous terrain
was far slower than that of the 2½ ton truck, but this was
compensated for by the additional lift provided when speed
was not essential.

Specific tested load capacities were as follows:

QM Class I

"10 in 1" rations	548 cases	12	tons
"K" rations	520 cases	11	tons
"C" rations	576 cases	12	tons
Hay	95 bales	2	tons

QM Class II & IV	10	tons

QM Class III

Gas, diesel oil and kerosene in drums	48 drums	10.5	tons
Gas, etc. 5 gal. cans	571 cans	12	tons
Oil, in cans	511 cans	12	tons
Greases, gear lube	511 pails	12	tons
Empty five gal. cans	828	2.5	tons

Engineer

Concertina & barbed wire	148	rolls	7 tons
Sand bags	41,500	bags	8.3 tons
Summerfelt matting	33	rolls	8.2 tons
Nails	225	kegs	12.1 tons
Lumber	7,500	board ft.	11.2 tons
Cement	235	bags	12.1 tons

Ordnance Class V

Ammunition, solid ammo and/or projectiles	12 tons
Ammunition, bulk or powder increments	8 tons

12. Communications for the Transportation Section

Because of the heavy and variable requirements placed upon the Transportation Section, efficient operation required practically instant communication with its divisions and outlying sub-divisions, and with dumps and other headquarters.

To meet the signal requirements in the many aspects presented by the extensive operations of the Transportation Section, Fifth Army, the following services were established by a Signal Operating Company attached to the Transportation Section.

A complete signal center was furnished at Transportation Headquarters, consisting of a Message Center; Cipher Section; Dispatch, Radio Control, and Teletype Section; and a Telephone Switchboard. The messenger requirements were met by seven daily messengers throughout a twenty-four hour period, with properly classified officers satisfying courier requests for ''Top Secret'' materiel. Two radio nets were operated at the Headquarters, one an army forward echelon net with Army as Net Control Station, the other strictly a Transportation net, having from three to eight out-stations depending on wire facilities and possible emergencies. The clearance

469

of schedules by the Movement Control Division and the dispatch of transport by the Freight Division had to be completed in minimum time to be effective. Since the processes of coding and decoding necessitated by the use of radio entailed undesirable delays, experience showed that the maximum use of wire was absolutely essential, thus allowing radio to become increasingly effective by virtue of the reduced traffic. Teletype was required for cable traffic, and since most traffic was destined for multiple addresses located at all larger headquarters of the theater, a direct circuit to army forward echelon was required. Circuits were also established, wherever possible, through base centrals to provide alternate routing. The telephone installation required a TC-2 board, which proved very satisfactory. One such board was maintained in reserve to provide continuous service, as Transportation Headquarters had to move by echelon to maintain uninterrupted operation. A fixed installation and telephone numbering plan was established. Since reliable contact had to be kept with all truck battalions it was necessary either to wire them directly to the headquarter's switchboard, which was most desirable, or to provide a displaced switchboard, depending on the physical relationship of the headquarters to the truck battalions. Further, in order to control properly supplies and movement at forward dumps, a small switchboard was often required, particularly when such dumps were centralized. Trunking, as direct as possible, to headquarters was then provided to give efficient control. Telephones were installed at Traffic Control Posts wherever possible. The necessity for telephone service warranted the provision of reasonably long field wire circuits. When wire was not feasible, radio was provided requiring additional message center personnel at each Traffic Control Post so operated.

The Commander of the Signal Unit attached to the Transportation Section acted as a member of the Transportation Officer's staff, coordinating with the heads of the operating sub-divisions of the Transportation Section in providing their communication needs. He maintained close contact with

the Army Signal Officer and Base Signal Officer to secure maximum mutual benefits in the construction and provision of efficient and economical services.

13.   The Freight Division—Organization

As one of the operating divisions of the Transportation Section the Freight Division was made responsible for:

a. the arrangement for lift, or lift on order, of all Army tonnage from Base Section depots into Army base depots.

b. the coordinated movement, on order, of all army freight from Army base depots to forward truckheads.

c. the provision of transport for tactical lift of troops or equipment, or for movement of hospitals or other non- mobile installations.

d. the evacuation of Prisoners of War, refugees, and salvage, and for making the necessary arrangements for hospital trains.

To perform these functions, sub-sections within the Freight Division were organized as follows:

The commitment Group received all transportation orders from the Army services or other agencies, together with all related information, decided the transportation medium to be utilized, and made allocation of available truck lift or rail space against that order. They prepared a commitment form showing all pertinent information, which was sent to the Truck Dispatch Section or the Rail Section for action. The Commitment Group maintained a graphic chart showing progress of all outstanding commitments, trucks dispatched, balance of lift required, and time of completion of each commitment.

The Truck Dispatch Section performed the physical function of dispatching trucks against the outstanding commitments — either in convoy, on shuttle, or on miscellaneous dispatch as the situation demanded, phasing the trucks into points of origin and destination in accordance with their

known loading and unloading capabilities. This point was carefully checked in order to prevent unnecessary tie-up of transportation at any depot or other installation. The progress of all convoys was followed carefully, delays or difficulties noted, and immediate corrective action taken.

The Rail Section, on receipt of a commitment requiring a rail lift, immediately placed an order on the proper Base Rail Agency, arranging for sufficient cars of the proper type to be spotted at point of origin; then in accordance with the required loading time and travel time, indicated a specific scheduled train for the delivery of the commodity to the Army Railhead. The car numbers were determined at time of loading, and cars followed through until delivery was accomplished. Records for future reference were maintained on all orders and the car numbers relating thereto.

A Baggage Section was formed when the responsibility for the handling of baggage was transferred from the Quartermaster Corps to the Transportation Corps. This Section acted as a collection and screening agency for the baggage of all army troops, arranging for forwarding to any point designated, and tracing lost or delayed baggage. It cooperated with similar base, theater, and zone of interior baggage sections.

The Statistical Section compiled and assembled all reports emanating from the Freight Office, and provided such files and charts as were necessary to insure efficient statistical control of truck use. Each dispatch, whether Convoy, Shuttle, or Miscellaneous, was carefully processed on completion and the pertinent information recorded.

Specific reports prepared for the Army Transportation Officer and for the Army G-4 were as follows:

    a. Convoy Report - Daily.
    b. Miscellaneous Hauls - Daily.
    c. G-4 Availability Report - Daily.
    d. Organizational Breakdown - Daily.
    e. Hourly truck availability - Daily.
    f. Commitment Report - Daily.
    g. Dump performance report - Daily.

The section was further charged with daily posting of the following:

      a. Operational Log Book.

      b. Operational graphs.

      c. History Log Book.

Sub-Freight Sections, in sufficient numbers to operate existing Army railheads or "off the axis" truck lifts were maintained by the Freight Division. They performed the functions of sub-area control or of railhead clearance, operating a minor dispatch system (controlled by the central dispatcher at Freight Division Headquarters,) and controlling the necessary labor.

14. The Freight Division—Sub-Freight Operation at a Railhead or a Sub-Area of an Army Supply Zone

In so far as possible the Military Railway Service extended its rail lines into the army area, in some cases up to within but a few miles of the actual battle line. In order to provide for the acceptance of army freight from these rail lines, Transportation, in conjunction with the Military Railway Service and the Army Engineer, set up, at a location which best supported the existing tactical and supply plans, a railhead or railheads with sufficient sidings and unloading facilities to meet Army's tonnage requirements.

Upon completion of a railhead and prior to the receipt of freight, a complete Sub-freight Section was sent to assume control. Such a section consisted of one or two officers, enlisted dispatchers, office clerks, car clerks, operation personnel for a convoy assembly area and convoy motor pool, and checkers and interpreters to handle Italian Military labor.

Labor in sufficient quantity to handle the anticipated tonnage receipts was moved into the area, and sufficient trucks to handle clearance bivouaced in operational proximity to the railhead.

Then as the trains arrived on prearranged schedules, trucks were ordered in and dispatched under the same dispatch system as was maintained by the Freight Division, and under the control of that division, clearances for movement being obtained from movement Control Division.

In a situation where an army must operate on an extremely wide front, distances and communications may dictate that a sub-area control be established to support and move supplies to a remote section of the army area. In this event, the Sub-freight Section would again be called into use, and established in this Army sub-area with sufficient transportation to support specified Corps or Divisions. It would then operate in the same manner as Freight Division Headquarters.

In all situations, whether operating a railhead or a sub-freight station in a sub-area, the sub-freight section remained under the direct control of the Freight Division, received instructions as to what would be loaded forward, to what points, and at what rate, and made periodic reports of activities, availability, trend of orders, etc., in order to maintain the centralized control so very necessary for coordinated, economical operation.

15. The Freight Division—Coordination of Operations with Base Section

Consistent with the plan for centralized control of vehicular lift and road movements, the Army Transportation Section worked in a closely knit pattern with the Base Transportation Section in the handling of freight destined for Army, and in the regulatory control of Army and Base convoys moving between Base and Army territories.

In accordance with established policy, Base's responsibility was the stocking of all army base depots, Army's to lift from the army base depots to forward truck heads. However, due to Base's responsibility for the operation of two large and widely separated ports, and the supply of the intervening

territory between these ports, a tremendous initial drain was placed on their available truck lift.

Under these conditions, a cohesive plan was pursued in the stockage of the Army base depots calling for a coordinated system of joint haulage by Base and Army trucks. The Army Freight Division received all transportation orders from the Army services or other agencies and worked out a cooperative plan with Base Transportation to assure lift of the required tonnage to destination within the specified time limits, as indicated in the Transportation Order. To prevent congestion, both Base and Army trucks and convoys were phased into Army base depots at the hours requested by the services and in accordance with the service's unloading capabilities.

In the coordinated handling of rail lift of Army freight, the Base Rail Section, on order of the Freight Division, spotted sufficient cars of the proper type at the designated point of origin, and the Base Highway Section provided sufficient truck lift to load the cars. Base Rail then followed through to see that the train arrived on schedule at the Army railhead.

16. Evacuation : Prisoners of War

To economize on the use of transportation, a coordinated procedure was devised by the Army Transportation Officer and the Army Provost Marshal to utilize returning supply trucks for the evacuation of Prisoners of War.

This plan called for the establishment of an advance Army PW Collecting Cage near the forward Army and Corps dumps, permitting evacuation by division or separate organization through utilization of empty ration supply vehicles going to Army dumps. The guards were furnished by the units delivering the Prisoners of War.

Another cage was established near the Army base depot so that the Army supply trucks, on their return from the forward dumps, could deliver the PW's to the Army rear PW Cage for eventual pick up by returning Base convoys. Necessary guards were furnished by the Provost Marshal.

17. Traffic Control

To meet his responsibility of assuring efficient movement of traffic on the Army roadnet, the Army Transportation Officer maintained two operating divisions, i.e., the Movement Control Division and the Traffic Engineer Division, and designated a Traffic Control Officer to supervise their functions.

The responsibilities of the Traffic Control Officer were as follows:

a. To make the road reconnaissance necessary to the planning of traffic circulation and control.

b. After conferring with the Army Engineer, to recommend to AC of S, G-4, the publication of plans for the traffic circulation on the roadnet, including the designation of main supply routes and circulation restrictions.

c. To indicate to the Provost Marshal necessary types and degrees of traffic regulation, and changes therein when necessary.

d. To make or procure, install, and maintain traffic signs (guide, warning, and regulatory).

e. To recommend road and bridge improvements to the Army Engineer, indicating priority of importance.

f. To regulate the movement of convoys.

g. To regulate the movement of vehicles of unusual size or weight.

h. To prescribe movement schedules for groups of vehicles moving by infiltration, when the volume warranted control.

i. To maintain and operate Traffic Control Posts.

j. To coordinate traffic control measures in the Army area with those of adjacent areas.

18. Highway Traffic Control Code

Regulations governing the operation of vehicles on roads in the Army area were prepared by the Army Transportation Officer and the Army Provost Marshal. These regulations

476

were published as a "Highway Traffic Control Code", printed in all applicable languages—English, French, and Portuguese.

This Code provided corps, divisions, and smaller unit staffs with rulings to be observed in the planning of movements, large and small, through or into the Army area. The Code gave in detail the rules of the road, instructions for convoy operation, instructions for casual vehicles, and explanations of road signs.

The Code was disseminated down to include the individual truck driver. Necessary revisions were published from time to time in Army "Administrative Instructions."

19. The Movement Control Division

The Movement Control Division, another operating division of the Transportation Section, was charged with the responsibility of regulating convoys and other vehicular movements within the Army area and to and from Corps and Base areas.

The above responsibility entailed the solution of a multitude of complex problems. The large volume of traffic (up to 12,000 vehicles per day on a two lane road); limited road nets, mountainous roads, adverse weather conditions, road demolitions, and other enemy action all contributed to the difficulties that had to be overcome to assure an uninterrupted flow of essential traffic.

The Movement Control Division developed and operated a unique system of "time schedule control". All convoys, large infiltration movements, or special vehicles operating on or across MSR's (and such secondary roads as were designated from time to time) required "road movement approval".

"Convoys" were defined as movements of ten or more vehicles in a group.

"Large Infiltration Moves" were defined as those involving ten or more vehicles at a rate of more than four per hour, dispatched by an organization over one route between two fixed points.

"Special Vehicles" were those (such as tank transporters, pole trailers, etc.) so constructed or loaded that they could not maintain a speed of 15 MPH, or were over 60 feet in length or over 10 feet wide.

Supply convoys had first priority, except when the Army AC of S, G-3 indicated a higher priority for a troop movement. In cases of conflict as to priority between troop and supply movements a decision was reached by coordination between AC of S, G-4 and AC of S, G-3.

All scheduled movements were recorded and plotted on a March Graph in the central office of the Movement Control Division. This graph provided a visual outline of all movements, depicting locations of all convoys on specific roads at specific times. The graph was kept current, and permitted the movements situation to be constantly analyzed to permit the forecast of any possible movement conflicts and the initiation of necessary corrective action. All schedules were passed to the Traffic Control Posts covering the sections of road over which the moves were routed, and the actual running times checked, controlled, and reported to the Movement Control Headquarters.

The Movement Control Division maintained close contact with Corps and Base Section Movement Control Officers for the clearance and coordination of moves entailing the crossing of Base or Corps and Army boundaries.

Close liaison was also maintained with the G-3 and G-4 Sections of the Army to ensure the coordination of current movements, and to keep Movement Control currently informed of the tactical situation and possible tactical trends. This information enabled the planning section to prepare tentative plans for indicated future movements.

Periodic "traffic counts" were made by checking the number of vehicles, casual or convoy, passing given check points on MSR's or important secondary roads, or at important junctions or bridges. This information was recorded and graphed as a basis for the assignment of Military Police Posts, Traffic Control Posts, road patrols, and wrecker service,

and for use in the planning of large moves.* Further, since Transportation's authority included control of casual and civil traffic, the "traffic counts" provided a basis for restriction, curtailment or elimination of traffic of this type.

At the end of each twenty-four hour period, a report was made to the Transportation Officer, which contained the following information:

      a. Number of Northbound convoys.

      b. Number of Vehicles - Northbound.

      c. Number of Southbound convoys.

      d. Number of vehicles - Southbound.

      e. Total number of convoys.

      f. Total number of vehicles.

      g. Convoys off schedule.

      h. Delinquencies noted by TCP's.

The above information was filed and used as a basis for planning by the Transportation Officer and the Army Staff.

20. Movement Control—Traffic Control Posts

The Movement Control Division maintained and operated Traffic Control Posts at such locations as to assure control of the principal MSR's throughout the Army area. Generally they were located near corps and army rear boundaries on principal routes running forward, and near the extremities of any important lateral routes. Intermediate locations also were covered when it was necessary to control important junctions or provide control at lesser intervals along a route. When practicable and desirable, TCP's were situated at junctions where control of two or more main routes could be exercised. The mission of a Traffic Control Post was to control and expedite traffic circulation, particularly convoy movement, so that the army roadnet could be most efficiently employed for troop, supply and administrative movements.

The specific functions of a TCP were as follows:

      a. To control, expedite, and record convoy movements.

b. To regulate and enforce movement priorities as directed by the Transportation Officer and the Movement Control Division.

c. To regulate the flow of traffic into adjacent areas in an orderly and disciplined manner, in conjunction with the military police.

d. To maintain the most complete, up-to-date and accurate data possible in order to assist convoy commanders and casual drivers moving through Army territory by supplying them with directional and other information.

e. To prevent road congestion and convoy conflicts by the regulation of time schedules and routes of road movements as directed by Movement Control Division.

f. To report at specified times to Movement Control Division all actual data on convoy movement past the post, and all pertinent information on road and traffic conditions.

Unscheduled convoys, and convoys more than thirty minutes off schedule, were, without exception, removed from the road and scheduled or rescheduled through Movement Control. A convoy park to accommodate a minimum of 50 vehicles, and preferably 100 or more was therefore made available as near to the TCP as possible.

Military police in proper number to provide a twenty-four-hour coverage, were stationed by the Army Provost Marshal at all Traffic Control Posts to assist Transportation personnel in their functions, to enforce highway traffic regulations, and to direct traffic flow. They also handled any accidents occurring in the vicinity of the TCP.

Heavy wreckers were stationed at each of the TCP's and remained on twenty-four hour call for the removal of wrecks, disabled trucks, or other road obstructions that tended to congest traffic.

21. Movement Control—Field Supervisors

In a further effort towards perfection in the control of movements, the Movement Control Division obtained a further

physical check on road movements and conditions by the use of officer Field Supervisors. The Field Supervisor operated actively throughout the army roadnet, checking convoy movements, TCP operations, Military Police operation, road conditions, and depot conditions, and also provided liaison service to corps or divisions.

In the event of a particularly heavy movement or series of movements over a wide area, the Field Supervisor checked conditions from an observation plane. In this way, he immediately detected any tie-ups, or difficulties along the roads, and passed on this information to the nearest TCP, Movement Control Headquarters, or Military Police Post for action.

22.   The Traffic Engineer Division

Another important operating division of the Army Transportation Section was the Traffic Engineer Division, the Traffic Engineer acting in an advisory capacity to the Transportation Officer through the Traffic Control Officer.

The Traffic Engineer made the road reconnaissance necessary to the planning of traffic circulation and control, conferred with the Army Engineer, and presented their joint findings to the Transportation Officer to enable him to formulate plans for submission to the AC of S, G-4 for publication.

He recommended to the Army Engineer road and bridge improvements such as cloverleafs and overpasses, or any other construction necessary for the maintenance of fluidity of movement.

On request from the Freight Division for the establishment of a railhead at a given point, the Traffic Engineer obtained from the Division the required tonnage capacity of the railhead. He then surveyed the proposed site together with the Army Engineer and the construction engineer of the Military Railway Service, laid out a plan for the terminal and access roads, and prepared drafts requesting construction. He closely followed the actual construction to ensure proper working facilities and traffic circulation.

In order to facilitate planning of MSR's, rail development, traffic circulation, and depot sites for a future phase of operations, a continual map reconnaissance and actual road and area reconnaissance of forward areas was maintained. Tentative plans were prepared, tied in with tactical trends and Army ''future'' planning, and continually checked for accuracy and workability.

To further the above planning, constant liaison was maintained with the Army Engineer, the Provost Marshal and the Supply Services. Wherever possible, joint reconnaissance involving all of the above-mentioned agencies was made to provide coordinated, comprehensive planning in the selection of roads, depot sites, etc.

A ''master road condition map'' was maintained by the Traffic Engineer Division showing all information pertinent to roads and installations in the Army area, including bridge classification, one-way roads, by-passes, road widths, etc. This information was compiled from reconnaissance reports, engineer operation reports, TCP reports, and other sources.

In addition to the road condition map, a ''Road history book'' was maintained, containing a compilation of all information pertaining to each road from the time of its initial use. This consolidated information was available at all times to the other divisions of the Transportation Section, and to all Base, Corps and Army units.

At the time of the Arno flood, and through other periods of emergency, the Traffic Engineer Division acted as a clearing house on road information, compiling, sorting, and acting on same as required.

23.   Traffic Engineer Division—Signing

The Traffic Engineer Division was charged with the construction or procurement, installation, and maintenance of traffic signs to supplement the markers and signs installed by the Engineer. A Sign Section was developed, staffed with

trained personnel, and equipped to discharge this responsibility.

Traffic signs were invaluable in the maintenance of orderly and safe circulation on the army roadnet. However, their purpose was accomplished only if the signing were properly accomplished. Improper practices defeated the intention and hindered the traffic rather than helped it. Realizing the importance of the signing factor in traffic circulation, a system of Army signs, made to standardized specifications, was evolved by the Traffic Engineer.

Directional signing was of particular importance. Early in the campaign, freight convoys were frequently lost due to a lack of signs during fast moving situations. To prevent this the Sign Section developed its technique to such a degree that they could sign new roads and new depots as soon as they were opened.

The Traffic Engineer Division was responsible for the installation of the following signs:

    a. Route markers
    b. Route Junction signs
    c. Town names, directional and other guides
    d. Warning signs
    e. Regulatory signs.

It was further responsible for the construction of standard depot signs, Corps ''light line'' signs, and miscellaneous emergency signs.

To provide for the necessary installation and maintenance of signs in the Army area, the Sign Section maintained six mobile sign crews charged with, and equipped for the erection, clearing, and replacement of all Army signs.

24. *Traffic Engineer Division Sign Production*

Production of road signs and other traffic aids presented many problems, due chiefly to lack of experience and to difficulties in procuring necessary tools and materiels.

Sign blanks were made chiefly of lumber. Some new lumber was used but the chief source was salvage lumber from ammunition boxes, etc. Metal signs were also used, but limited supply prohibited their extensive use. Metal blanks were made chiefly of Terneplate, an Engineer supply item. This was supplemented by the procurement of some civilian stocks and, by salvaging large metal food containers. Some "masonite" signs were procured from the U.S., but they proved too fragile to be satisfactory. No paper or cardboard signs were used, as installations were generally established for relatively long periods of time which warranted more durable materiel.

The best type of stake for mounting signs was found to be the British 6 foot angle iron stake normally used for barbed wire. Two by four lumber was used for mounting large signs. To conserve stakes, available mountings such as trees, posts, and walls were employed whenever possible.

Paint was generally secured from Engineer supply sources although some civilian supplies were also used. Large amounts of "ammunition yellow" paint were secured from Ordnance. Camouflage paints were unsatisfactory as they did not permit the washing of signs.

Considerable effective use was made of reflecting materiels behind the "light line". Sign faces were reflectorized by the use of "prismo paint" (glass beads mixed into paint). Letters and symbols were reflectorized by the use of "scotchlite", a glass bead substance produced commercially in sheets and rolls which could be cut to form desired letters, numbers, or other designs, and glued or tacked on the signs. Scotchlite was also used to make small reflector tabs for road delineation and obstruction marking. Lucite reflector buttons were used to a limited extent for this purpose; however, the scotchlite reflectors were found to be a satisfactory substitute, and less subject to pilferage. Forward of the "light line", limited use was made of radium buttons. They made effective signs and arrows for road delineation and hazard marking on very dark nights and with very low vehicle speeds. However, stocks were limited and the pilferage rate was high. Phosphorescent

materiels were found unsatisfactory due to the rapid decrease in light output and to obscuration by dust. Interior-illuminated signs meeting blackout requirements were satisfactory traffic guides, but presented serious problems of maintenance.

Essential sign production tools and equipment were found to be the following:

a. Paint spray guns (1 qt. type)

b. Motor driven air compressor, with oil and water separator for use with spray guns.

c. Metal stencils (cut to meet actual needs, rather than procured from commercial sources ready made.)

d. Cutter, large enough to cut metal up to 20 gauge.

e. Motor driven circular saw.

f. Carpenter tools, paint brushes, stencil paper, nails, wire, etc.

25. Military Police Traffic Posts and Patrols

Traffic Posts and Patrols maintained by Military Police were an indispensable part of the Traffic Control Plan. They were fully coordinated with the Movement Control and Traffic Engineering operations of Transportation.

Motorized patrols were provided on main routes, with fixed posts established at key road junctions, bridges, etc. Military Police posts were also established at all Traffic Control Posts operated by Movement Control. It was found that one Military Police Company normally could police up to about 75 miles along a heavily travelled road. This distance was increased on roads possessing few critical locations.

Coordination of the Military Police and the Traffic Control personnel of Transportation was effected by detailing an MP liaison officer to the Transportation Section. This facilitated the coordination of control plans, and provided the Military Police with advance notice whenever heavy or unusual road movements were contemplated, or special circulation restrictions were to be placed upon the roadnet.

Essential traffic control duties performed by Military Police included:

  a. Regulating traffic flow at road junctions, one lane bridges, and other conflict points.

  b. Controlling and enforcing traffic regulations at TCP's.

  c. Patrolling roads to enforce driver discipline, with special emphasis on excessive speeds, improper doubling, unauthorized stopping on roads, violations of circulation restrictions, and improper convoy intervals.

  d. Giving route and location information.

  e. Clearing traffic jams and establishing special control in emergencies.

  f. Escorting oversize loads.

  g. Reporting road traffic conditions requiring road or control improvement, detours, etc.

  h. Investigating and handling emergencies such as accidents.

  i. Operating vehicle check points.

It was found practicable to substitute Italian Military Guard personnel for MP's at some fixed traffic posts, such as one lane bridges in rear areas. This helped to relieve the shortage of regular military police. However, this could not be done at critical locations or at points where the ability to give information and directions was important.

A high degree of motorization of MP units was necessary for effective traffic control work. Both motorcycles and jeeps were required for patrols under varying conditions.

Experience demonstrated that a single Field Army type Military Police battalion was inadequate for the traffic control and other duties required to be performed by the Military Police of an Army, especially since a company had to be attached to each corps. Two or preferably three such battalions were required to cover adequately the long lines of communication which prevailed in Italy without impairing performance of other Military Police functions.

26.   Light Lines and Blackout

After the initial enemy air activity in Italy was counter-acted by the advent of sufficient Allied air strength, it was found that undue emphasis on blackout of vehicle lights in rear areas of corps and in the army area handicapped night transportation operations. A general policy of operating vehicles with lights as far forward as tactically possible was followed. Operation under this policy proved that by the use of headlights, night operations compared favorably with normal daylight operations, and further, that the decrease in accidents more than compensated for the negligible casualties and damage from enemy air action incurred by their use.

27.   Emergency Traffic Control under Winter Conditions

Winter conditions in Italy threatened extensive and prolonged interference with road movements. Road blocks developed due to the failure of bridges, flooded areas, slides, washouts or deep snow.

It was imperative that road communications be kept open during such critical periods, for troop, supply, and adminis-tative movements had to continue. This required prompt and effective initiation of pioneer work and traffic re-routing. Accomplishment of these necessary actions was in turn pri-marily dependent upon an up-to-date and accurate flow of information regarding road and traffic conditions to the coordinating headquarters.

Assurance of adequate roadnet facilities and control of traffic thereon was secured through combined action of the Engineer, Provost Marshal, and Transportation Officers, who in turn called upon other sections for necessary auxiliary service. These three sections each had specific duties, and coordinated their efforts closely. This coordination involved the mutual exchange of information as to road conditions and

remedial plans, agreement on measures to be taken, and mutual support in the execution of such measures. The specific responsibility of each section within its own sphere of operations was as follows:

a. *Engineer*: The Operations Section of Engineer Headquarters collected and served as a central source of road information, directed operations of Engineer units, and maintained liaison with Transportation. Each Engineer unit was responsible in an assigned area for: (1) keeping MSRs open or developing suitable by-passes if possible; (2) operating Road Posts; (3) posting signs to guide traffic through by-passes; (4) immediately notifying the nearest TCP of emergency conditions. The TCP informed the Movement Control Division, which in turn advised the Military Police and directed necessary changes in routings, etc. Similar reports were made to Engineer Operations Section.

b. *Transportation*: The Transportation Section was responsible for: (1) routing traffic in accordance with existing road capabilities: (2) prescribing circulation restrictions applicable to specific routes or types of traffic; (3) advising the Provost Marshal of restrictions to be enforced and points requiring MP control: (4) collecting data on road and traffic conditions; (5) maintaining liaison with the Engineer Operations Section and with Road Posts.

c. *Provost Marshal*: The Provost Marshal directed the operations of MP units. He maintained liaison with Transportation Section on matters of road and traffic conditions, circulation plans and restrictions, and MP control requirements. MP units: (1) established necessary posts and patrols as directed by the Provost Marshal, or as indicated by their own observation of emergency needs, or by requests from the Transportation Sections; (2) directed traffic and enforced circulation restrictions in accordance with plans indicated by Transportation or, in emergencies, in accordance with the requirements of the situation as determined by them or indicated by Engineer units; (3) reported need for Engineer work and for traffic re-routing to Transportation.

The existing telephone net was used insofar as possible for contact between the Road Posts, the TCPs, and the Staff Section Headquarters. In the event of failure of telephone communication, contact was immediately made by radio, using radio equipment and signal personnel at Road Posts and TCPs, with mobile transmitters standing by for dispatch to crucial points. The Road Post radio net and log messages were continually monitored by Transportation's Signal Operating Company, and reports passed on to Traffic Engineer Division for action.

28. Road Posts

In order to cope with snow and ice conditions, and in general to expedite traffic over the mountain roads during the winter, the Army Engineer operated Road Posts and Sub-posts in sufficient numbers to insure complete coverage of the Army roadnet.

These Road Posts and Sub-posts were charged with the following services:

a. Removal of snow

b. Recovery of and assistance to damaged or stalled vehicles

c. Provision of first aid and medical assistance

d. Provision of food and shelter for stranded personnel

e. Furnishing of information on road conditions.

f. Stockage of an adequate supply of gas and oil for the emergency refueling of vehicles.

g. Assistance in traffic control.

The posts were staffed with Engineer, Transportation, Signal, Ordnance, and Medical personnel, and proved to be an indispensable adjunct to the transportation and traffic control establishment.

29. Port Development by a Field Army in Fast Moving Situation Paralleling a Shore Line

In the rapid push through Rome and to the north, the Army completely outran railroad construction. Truck transport proved inadequate despite the utilization by Army Transportation of every available truck. To meet this situation, the Fifth Army initiated an entirely new phase of supply technique. Based on its experiences in port operation at Anzio, the Army brought about the rapid reconstruction of the Ports of Civitavecchia and Piombino, and actually operated these ports under Army G-4 control. In each instance tonnage was flowing ashore less than a week after the ports were captured.

These operations demonstrated the practicability of the organization and opening of sub-ports by Army, and of their operation by Army until such time as it is most expedient for the Base Section to take over.

Since considerable planning and organization was necessary prior to the capture of the ports, a group was formed in the Army G-4 Section to plan and coordinate the port project at hand. Based on the anticipated port tonnage capacity and other factors of supply, this group organized the necessary staff and operating agencies as follows:

a. A properly equipped Army Engineer Regiment.

b. Port Operating personnel (From Base Section).

c. Naval Officer In Charge, (NOIC), with necessary Naval detachment, small craft, signals, control craft, mine sweepers, and salvage unit.

d. Transportation representative, with Sub-Freight Section, and sufficient transport (trucks and DUKWS) to clear anticipated tonnage.

e. Provost representative, with MP Detachment.

f. Army Signal representative, with Signal unit staffed

and equipped to supply required port communications other than naval.

   g. Representatives of each of the supply services, with depot companies, for supply liaison and depot operation in port area.

   h. British liaison. (British Supplies were to be received.)

   i. Air Corps liaison. (Air Corps supplies were to be received.)

   j. Anti-aircraft and barrage balloon units.

   k. AMG unit.

   l. Engineer Real Estate Unit.

   m. G-1 representative, for handling personnel.

   n. G-3 representative, for periods when troops were staged in or out.

   o. Sufficient labor for port clearance.

  Maps, naval charts, recent air-photographs, relevant Italian technical literature, and available G-2 information were closely studied by the Engineer and Naval groups so as to pre-plan, insofar as possible, the entire reconstruction.

  The G-4 Group set up shipping and supplies for basic lift, and figured supply for concurrent shuttles.

  Tentative circulation plans were laid out by the Transportation Officer, and tentative depot areas allocated to all the services by the Real Estate Officer. All parties collected sufficient equipment, supplies, and personnel to initiate operation.

  If possible the Engineer Regiment was relieved of other responsibilities a few days prior to the date of anticipated capture of the port, to permit it to devote all of its time in preparing for the port work. At the same time, the Naval party was collecting necessary craft and harbor clearance equipment in a sea assembly area near the port.

  As soon as tactically possible, under the supervision of G-4, a reconnaissance party with representatives from all sections of the operating group moved into the port area to plan the installation locally. As a result of this reconnaissance, actual reconstruction was started by the Engineer; a Port

Headquarters established; naval mine clearance and salvage anti-aircraft weapons and barrage ballons installed; port area road circulation designed and signed; communications installed and tied in to rear headquarters and Base Section; depot and port labor moved into area; port clearance trucks and dukws moved into area; safe sea lanes plotted; initial craft lift ordered forward; and actual port operation started as soon as practicable.

The G-4 Section at the Port controlled all shipping and supply functions in conformance with the policies prescribed by AC of S, G-4, Fifth Army. This Section maintained constant liaison with Army Headquarters and all information concerning supply and shipping was immediately passed on to the Army G-4. Assisting the chief of this section were two officers. One officer maintained contact with all services, keeping records of stock levels. The second officer maintained constant contact with the shipping situation.

The Commanding Officer of the Port Engineer Regiment was appointed Port Commandant, with responsibility for the entire port area. He sub-divided the area, utilizing his Battalion Commanders as Harbormasters, or beach or jetty commanders; his S-3 operated the Port Operations Office, maintaining liaison with G-4 and the NOIC, and submitting daily situation reports to G-4 covering the entire shipping and tonnage situation. Under this command, the Engineer Regiment was responsible for the following:

    a. Maintain and build roads

    b. Repair damage to port installations

    c. Continually improve dock and beach facilities

    d. Record berthing or arrival and sailing hours of all ships or craft entering or leaving the harbor

    e. Record all cargo and personnel entering and leaving the Port

    f. Supervise labour and clearance of supplies in port area

The Naval Officer in Charge (NOIC), controlled all ship and landing craft movements in the waters off the port. He also: operations begun; depot areas allocated, set up and signed;

  a. Scheduled and dispatched to ships for unloading duty all LCT's, LCI's, LCM's, or other small craft.

  b. Maintained communications with NOIC in Base Port

  c. Protected ships and craft lying off port by mine sweeping and by maintaining constant vigil against E-boat and air attack

  d. Maintained communications with ships and craft, issuing anchorage orders, sailing orders, etc.

  e. Salvaged navy materiel.

  f. Succoured survivors of ships sunk and provided transportation for them to Base Port.

  The NOIC maintained a Naval Operations Section, which notified the Port Operations office and the NOIC of Base Port of the arrival and sailing of ships and craft, and of damage to shipping resulting from enemy action. A signal ship or tower was maintained for visual signalling to ships and landing craft. A control ship patrolled the waters in and near the harbor. The personnel of this ship included a representative from NOIC, and one from the Port Commandant for the purpose of controlling small craft engaged in unloading ships.

  The Detachment of a Base Port battalion assigned for Port operations supplied the labor and gear for the unloading of the ships. The headquarters personnel of the detachment acted in an advisory capacity to the Port Command.

  The Transportation representative, operating his Sub-Freight Office, set up "control towers" and "check points" in sufficient numbers to control the flow of trucks and dukws on to the "hards" and piers, and to clear rapidly the loaded trucks and dukws from the congested port area. The Sub-Freight Office remained in close contact with the Port Operations Office and the NOIC in order to keep informed of the types and quantities of incoming tonnage so as to provide special lift equipment if necessary, or increase or decrease the flow of clearance trucks into the port in accordance with the fluctuating unloading program. This office also remained in close contact with all Port depots, and with Depot Supervisors

in the field to check handling of Port clearance trucks, unloading capacities, labor difficulties, depot road conditions, depot signing, route signing, etc., and to advise the depots in the event of the arrival of heavy quantities of any particular commodity. It continually checked traffic circulation, signing, and control, making improvements when necessary, and maintained constant liaison with the Provost Marshal, making necessary recommendations for MP control.

The Provost Marshal was charged with local security and the regulation of traffic in accordance with the orders of the Port Commandant and Transportation.

The Service representatives and Depot Commanders maintained continuous records of their receipts and issues. They maintained sufficient supervised labor to receive and unload trucks without delay.

The area AMG Officer cleared refugees from the port area, secured civilian labor when necessary, and provided covered storage space when required.

In both Piombino and Civitavecchia the tactical situation continued to be fast moving and the Base Section was alerted at an early stage to be prepared for a rapid assumption of Port responsibilities without bringing operations to a halt. By phasing into the operations Base personnel, equipment, and transport, allowing them to work for a time with the Army agencies, gradually taking over the actual operations, no loss of tonnage was experienced.

Port operation is essentially a Transportation function. However, since there was no Water Division in the Transportation Section, the development and operation at Piombino and Civitavecchia were carried out directly under Army G-4 control. However, the normal function of providing a tie-in to Base and higher Headquarters to cover the movement and receipt of Army supplies and personnel by water, and the function of dealing with Port operations as required, could best be handled by the inclusion of a Water Division in the Army Transportation Section.

30. Supply Maintenance of a Limited Beachhead for a Prolonged Period Based on the Anzio Operation

SECTION A—SUPPLY BY WATER.

SECTION B—DESCRIPTION OF THE PORT AND BEACHES AT ANZIO, ITALY.

SECTION C—DATA ON SUPPLY BY LANDING CRAFT.

The amphibious operation against a hostile coastal sector is in every instance a gamble; each and every possible adverse factor, such as the weather, and enemy air, land or sea action, must be taken into consideration in the planning.

A. SUPPLY BY WATER

1. Planning

During the planning of the Anzio operation, it was recognized that the element of surprise would play a large part in the ultimate success of the operation. Under the circumstances, this seemed almost unobtainable since a large fleet of various types of ships and landing craft could not be assembled in and around Naples without the enemy's knowledge. He would know a force was gathering, but not when or where it would attack. From past experience, he knew we had always captured large ports to facilitate resupply of our invasion force. Along the west coast of Italy between Naples and Leghorn, there were no ports of sufficient size to support a force large enough to worry about. The largest was Civitavecchia, just above Rome, which had facilities for the docking of ships. The next largest port was Anzio, and this was so small that it was probably not considered by the enemy. The surprise achieved was due, in part, to the fact that the enemy did not think we could support a large force by resupply through the port of Anzio.

The plan for resupply was well organized and executed. After the initial assault it was necessary to place 2700 tons

495

of supplies daily into the beachhead dumps for maintenance, and 3750 tons to permit a build-up of four days supply every 10 days. This was changed, subsequently, to a maintenance level of approximately 3300 because of an increase in troops.

VI Corps organized and mounted the assault forces while Fifth Army prepared to supply the force. To accomplish the latter, two methods of operation were used. The first was to load Liberty ships in North Africa, to be unloaded at Anzio in a ship to shore operation. The second was to organise a large group of trucks to ferry supplies by LST from Naples to Anzio, the trucks to return empty (or loaded with salvage) for the next turnaround.

2. Loading of Liberty Ships in North Africa

Based on supply needs of the beachhead, requisitions were sent to North Africa for supplies to be loaded on Liberty ships. These ships were to sail from North Africa to Naples upon completion of loading. At Naples some ships were top-loaded with supplies unavailable in North Africa, and with other supplies that were needed.

Due to exposure to enemy surface and aircraft in the Anzio sea area, a limitation was set by the Naval Officer in Charge, on the number of ships which could be unloading at any one time. Thus Liberties were scheduled to leave North Africa in flights of four, as the plan contemplated the unloading of four Liberties at a time at Anzio. Later, other Liberties were added to the scheduled flights to carry supplies that were found to be needed over and above those planned. When the port of Anzio was released by VI Corps to Fifth Army, the number of Liberties unloading simultaneously was increased to five.

After the first flight, as Liberties completed their unloading they were immediately replaced by an equal number so that the semblance of "flights" was broken.

3. Unloading Liberty Ships at Anzio

Various experiments were tried in order to speed up the unloading of Liberties, some of which were very successful.

496

Original plans provided for the unloading to be accomplished by a Port Battalion with headquarters at Anzio. Each Port Company was to unload a ship using LCTs and DUKWs to carry supplies from the ship to the shore. Because of the constant shelling by enemy heavy artillery, it was decided after several weeks of operation to send each Port Company back with the ship it unloaded thus providing an incentive for speedy work and eliminating the need for changing companies from ship to ship or for maintaining a Port Battalion Headquarters at Anzio.

Another problem was the scarcity of LCTs after a month of operations. Initially, 32 LCTs were available for unloading but under the conditions at the port, many became non-operational. We could not depend on using the total number of LCTs available at any one time. In order to supplement the LCTs, 10 LCIs were used as an experiment, carrying deckloads of from 10 to 20 tons. This proved successful and the number of LCIs was increased from 10 to 20. This practice was discontinued when LCTs again became available.

Between 450 to 490 DUKWs were provided for unloading Liberties. Even allowing 25% on deadline, the DUKWs were never taxed to capacity. Because of the constant shelling of the harbor, the ships were sometimes forced several miles out to sea which rendered the use of DUKWs impracticable. Weather conditions had to be excellent or we lost DUKWs by sinking. However, when both conditions were favorable, the DUKWs performed to the maximum of their capacity and accounted for approximately 25% of the tonnage unloaded by ship to shore operation on peak days.

Ten LCMs were sent to Anzio to unload Liberties but their use proved unsuccessful for two reasons. The first was that the LCMs were old and subject to frequent breakdowns. The second was the lack of berthing space in the harbor during bad weather when all the port landing craft were tied up and the landing craft on ferry service from Naples were trying to unload.

497

4. Resupply direct from Naples

Most of the supplies shipped directly from Naples were handled by 2½ ton trucks which were ferried between Naples and Anzio on LSTs. A reserve of approximately 1500 trucks was set up under one command and organized as a Truck Group (Provisional). This unit operated under the supervision of the Fifth Army Transportation officer.

The first flight consisted of trucks from various units embarking with VI Corps on the assault flight. After depositing their loads at the beachhead dumps, the trucks dispersed and reported to their respective units. Since the LSTs were to land on a prepared beach, the number of trucks was limited to 35 trucks per LST. Five-ton loads on each truck plus the weight of the trucks totaled 350 tons, which was the limitation set up by the Navy.

The second and succeeding flights of trucks were organized, loaded and mounted by Fifth Army. The second flight consisted of 541 trucks, some of which were British lorries. All trucks were assembled at a truck assembly area in Naples and were dispatched to Class I, III, and V dumps. When they returned, they were assembled by LST loads and waterproofed. Each truck carried only one type of supply so that it stopped at only one dump in Naples and one dump in Anzio. The LSTs were spread-loaded, for example: 20 truckloads of 105mm ammunition were broken up and loaded on 15 different LSTs to prevent total loss of one type of supply through the loss of one LST.

Each craft load of 35 vehicles was staged at the Provisional Group assembly area. A combination passenger list and manifest was prepared and submitted to Transportation Section PBS. No prestowage plan was prepared because of the simplicity of loading only thirty five 2½ ton trucks per LST. Each craft load was assigned an Army Serial Number; for instance those assigned on the 28th of January began 28 A, 28 B, 28 C, etc. In that way, any backlog could be immediately identified as to day and craft load. Ferry control and

PBS then assigned LSTs to Army Serial Number and called forward, for example, 28A to load when its assigned LST was reported by Naval Operations as being berthed and ready.

The third flight of 500 trucks followed the same procedure. About the time it reached Anzio, the empty trucks from the second flight were returning and were reloaded with supplies for the fourth flight.

At this time the Navy changed the loading limitations because the LSTs were unloading at the docks in Anzio harbor. This allowed the loading of 50 instead of 35 trucks per LST and eliminated the need of waterproofing. From then on, 8 LSTs daily were scheduled to sail to Anzio to be split as directed between tactical troops and supply trucks. Previously there had been enough LSTs sailing daily to permit the number of empty trucks reloading at Anzio to be limited to 25, thereby speeding up the reloading of LSTs. This was very important because of heavy shelling and frequent air raids. When the number of LSTs was reduced to 8, it was imperative that all 8 LSTs returned the same number of trucks they brought in order to keep the backlog of trucks at an irreducible minimum of 150 trucks. These 150 trucks remained at the beachhead overnight and were loaded on the first LSTs arriving in the morning.

The general schedule for LSTs was as follows:

a. Loading of LSTs at first light in Naples area.

b. Convoys sailed at 1700 and arrived at Anzio 0600 the following morning.

c. Unloading at four LST berths at Anzio during morning, usually four at a time; sometimes less because of enemy shelling or congested roads.

d. Average unloading time — one hour and a half.

e. Average reloading time — one hour. Trucks were driven aboard head-on at Anzio to save valuable time during reloading.

f. Reassemble Anzio harbor to sail to Naples between 1600 and 1800.

5. Casualty Evacuation

The evacuation of casualties was, for the most part, by hospital carrier. The carriers were not able to dock at Anzio so two LCTs were used to transport the casualties to the carrier's side. For the comfort of the litter cases, canvas canopies were set up over the entire deck of each LCT. During inclement weather, when the sea was too high for the transportation of casualties to the carriers, they were loaded on the tank decks of LSTs. Because of the importance of sending back empty supply trucks to Naples, this method was not used unless it was impossible to load casualties on the carriers. Casualties were the only personnel to take priority over supply vehicles on the LSTs. The most difficult part of the evacuation was the coordination of shipping with the stream of ambulances coming from the hospitals. Because of the constant shelling, air raids, and the already congested roads, it was necessary to have complete coordination in order to avoid having a long line of vehicles standing waiting in the town of Anzio.

6. Summary - Supply by Water

The methods employed to supply troops in the Anzio Beachhead were considered to be very successful. The importance of the supply problem was emphasized by the fact that unless sufficient, supplies could continue to flow into the beachhead, an increase in fighting strength would have been impracticable. During inclement weather, when ship to shore operations were prevented, the balance of supplies was maintained by increasing the truck turnaround on direct supply from Naples. Efficient organization, and close coordination and cooperation between all agencies concerned, mainly the Army and Navy, resulted in the unloading of far greater tonnage than was estimated to be possible at the beginning of the operation.

B. DESCRIPTION OF THE PORT AND BEACHES AT ANZIO, ITALY

1. Jetty

Three Mark III or IV British LCTs or four Mark V American LCTs were the maximum that could berth alongside

YELLOW BEACH

NORTH HARD

BOAT HARBOR

SHOAL

LCTs

WRECK BUOYED

WRECK-MAST VISIBLE

LSTs

WRECK

LCTs

WRECK ALONGSIDE VISIBLE

N

Porto D'Anzio

NOT TO SCALE
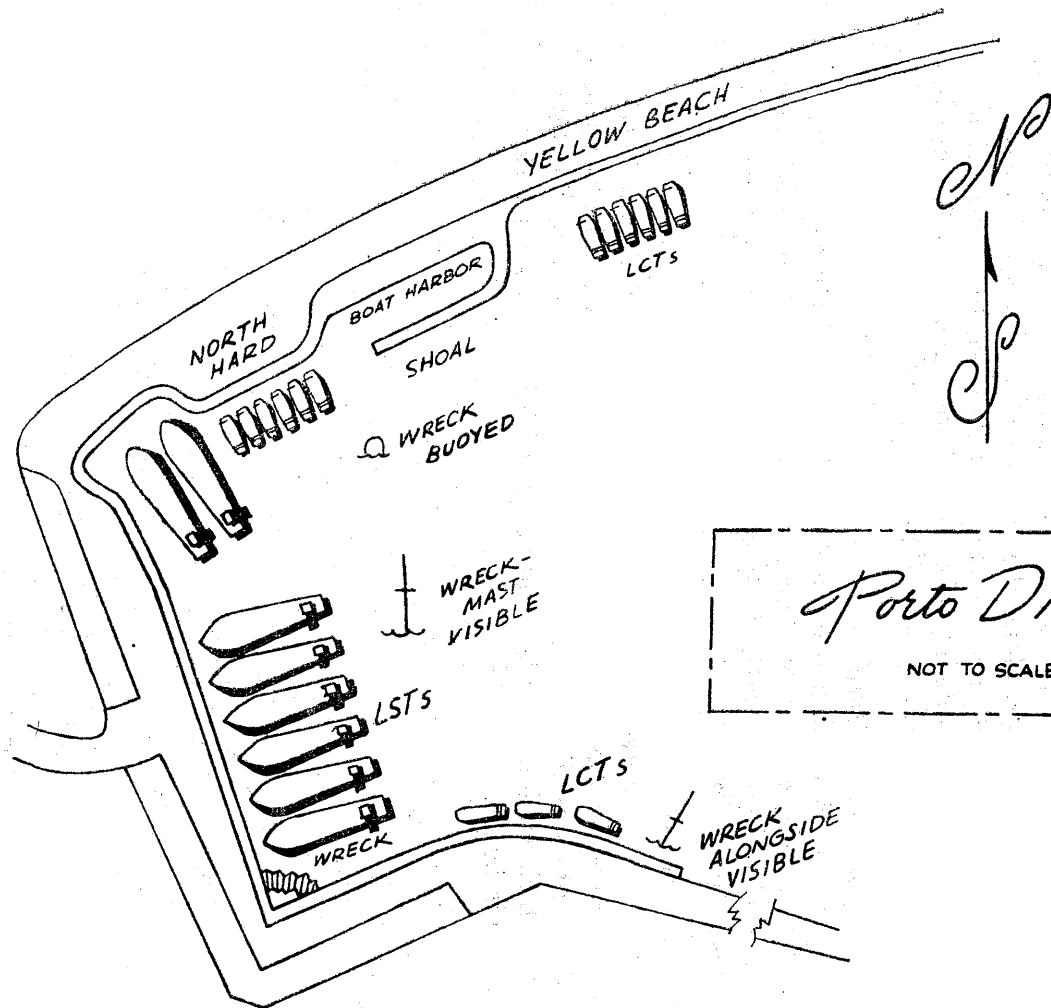
the wall on the Jetty. Cargo was discharged by crane for heavy lifts and manually for light lifts.

LCIs could use these berths for the discharge of personnel or cargo.

2. LST Berths

A maximum of eight LSTs could berth in the harbor at any one time. Six LSTs could berth along the west wall and two LSTs could berth along the North wall. In case of necessity, LCIs could berth along either wall (bow in) to discharge personnel. The banks at these berths were too steep for use in discharging cargo from LCTs.

3. North Hard

A maximum of seven LCTs could berth at the North Hard. Cargo was discharged manually into trucks that were backed into the craft. Only craft with light lifts were beached at this point.

4. Yellow Beach

An average of five LCTs were kept off Yellow Beach. The water was too shallow at this point for craft to be beached. Cargo was discharged manually from the craft into DUKWs which came alongside. Only craft with light lifts were sent to this beach.

C. *DATA ON SUPPLY BY LANDING CRAFT.*

	Jetty	North Hard	Yellow Beach	Average
1. *American LCTs*				
Average time alongside of Liberty ship.				{5 hrs 48 min
Average load (tons)	125	108	124	119
Average time discharging	{4 hrs 49 min	{7 hrs 5 min	{4 hrs 15 min	{5 hrs 23 min
Average tons discharged per hour	33.6	17.6	21.2	24.1
2. *British LCTs*				
Average time alongside of Liberty ship				{5 hrs 48 min
Average load (tons)	175	189	185	183
Average time discharging	{5 hrs 17 min	{11 hrs 14 min	{8 hrs 25 min	{8 hrs 19 min
Average tons discharged per hour	33.6	17.6	21.2	24.1
3. *All LCMs (Br. & Amer)*				
Average miles from shore to ship				1¾
Average time from shore to Liberty ship				10 min
Average time alongside of Liberty ship				57 min
Average load (tons)	17.4	15.3		16.4
Average time discharging	{2 hr 10 min	{1 hr 54 min		{2 hr 2 min
Average tons discharged per hour	8.6	9.8		9.2

4. *Dukws discharging cargo from Liberty ships*

Average miles to Liberty ship	1¾
Average time from shore to Liberty ship	25 min
Average time alongside Liberty ship	10 min
Average tons per load	3 tons

5. *Dukws discharging cargo from LCT's*

Average tons on LCT	154.5
Average number of DUKW loads	55
Average time to load each DUKW	6 min

6. *Dukws discharging cargo from LCIs*

Average tons on LCI	43.2
Average number of DUKW loads	22
Average time to load each DUKW	13 min

7. *LCIs used for discharging Liberty ships*

Average miles from shore to ship	1 ¾
Average time from shore to tie up alongside Liberty	20 min
Average time alongside Liberty ship	{3 hrs {20 min
Average load (tons)	35.1
Average time discharging	{3 hrs {32 min
Average tons discharged per hour	9.9

8. *LSTs bulk loaded at Naples*

Average load (tons)	266.4
Average time discharging	{4 hrs {25 min
Average tons discharged per hour	60.3

The Port received five LSTs bulk loaded from Naples. All were loaded with rations. Roller conveyors were used

initially on all ships to move cargo to trucks parked at the end of the ramp. In one case the conveyor was discarded as soon as it was feasible to back three trucks abreast into the ship and right back against the cargo stacks. In another case the use of one line of conveyor in addition to three trucks abreast was attempted. This conveyor fed a truck standing ahead of the three against the stacks. This conveyor however became unwieldy as the length increased, and required a larger number of men to keep the cargo flowing. In addition, the room taken by the conveyor decreased the lateral space for trucks.

Maximum rate of unloading was obtained when the cargo consisted of light weight uniform packages. The most efficient distribution of men and trucks was the use of three trucks abreast and sixty men loading. The use of hand trucks was not practical in this type of unloading. No cargo should be stacked forward of the elevator hatch. Instead, cargo should be stacked higher and at the rear end of the tank deck, thus freeing the forward part of the tank deck and all of the top deck for vehicles, and allowing full room for trucks to maneuver on the flat surface.

Forty trucks per ship were required to make the turn around from ship to dump and back again without loss of time, based on an average turn around of eight miles per truck.

MEDICAL

MEDICAL

1. Hospitalization and Evacuation Report

A daily Hospitalization and Evacuation Report was required by the Army Surgeon from all army hospitals, and by Corps and Division Surgeons from all clearing stations under their control. This was an operational statistical report, which provided daily data regarding casualty admissions and dispositions by type, number of vacant beds, number of non-transportable casualties, and communicable disease data. In consolidated form, these reports were both operational and historical in application, becoming the official record of hospitalization and evacuation performed by the army medical service. These reports became the basis of experience analyses for the purpose of evaluating effectiveness of hospitalization and evacuation facilities, and were used as reference data for operational planning. Weekly Statistical Health Reports, MD 86 ab (required by theater and War Department) did not provide these types of data in sufficient detail.

2. Communicable Disease Report

A special communicable disease report containing the patient's name, organization, the definite diagnosis and whether diagnosed by the unit dispensary or Army hospital was found necessary. It was submitted daily to the Army Surgeon's Office by all army hospital installations. Existing standard statistical reports from Army hospitals did not show incidence of communicable disease by individual units within the Army. Information obtained from the special communicable disease reports was tabulated in order that any unusual incidence occurring in any unit could be easily detected and quickly investigated.

3. Special Medical Hospitals

The need in a field Army for hospitals restricted in their activities to the diagnosis and treatment of medical cases was proved. The present Field Hospital with an augmented staff of specialists in medicine proved satisfactory. There was need for one such hospital for each two and one-half divisions assigned to an army. Evacuation hospitals were not suitably staffed to answer the need.

4. Functional Reorganization of Two Army Medical Battalions

Because of an urgent need for additional hospital beds in the Fifth Army, two Army Medical Battalions were functionally reorganized to provide four 250-bed hospital installations. This was accomplished without a change in the total number of grades or ratings in the battalions since proportionate numbers were placed on detached service with the Medical Clearing Companies from the Medical Collecting Companies.

The ambulances of the Medical Collecting Companies of the medical battalions were utilized to evacuate division, corps, and army hospital installations as the need arose. Wherever possible, the ambulances not on a specific detail were pooled for immediate call to any of the hospital installations for the evacuation of casualties.

The four 250-bed hospital units (each representing an augmented platoon of the Medical Clearing Companies) were used as adjuncts to the Army Evacuation Hospitals, thus increasing their bed capacities, or as distinct hospital installations. In the latter case, two of the hospitals at one stage operated as a Gastro-Intestinal and Psychosomatic Center to investigate thoroughly the large number of patients with functional bases for their complaints. At other times they acted as general medical units. Of the remaining two, one was used as a Neuropsychiatric Hospital and the other as a Venereal Disease Treatment and Diagnostic Center.

5. "Holding" Hospitals

"Holding" hospitals were formed from either field hospital platoons or clearing company platoons, augmented by additional equipment, for the purpose of "holding" patients awaiting air evacuation or hospital ship evacuation. It was always endeavoured to transport patients directly from the evacuation or field hospitals to the plane or ship without a prior unloading at the holding unit. However, when inclement weather or other conditions altered the scheduled arrival of the planes or delayed the loading of the ships, it was necessary to "hold" patients until the loading on to the plane or ship could be accomplished. These "holding" hospitals were placed in close proximity to the air-strips or water area. An important function of these installations was to supply these patients with hot rations whether they were "held" or not. In stabilized situations these functions were taken over by the Base Section.

6. Army Venereal Disease Treatment and Diagnostic Center

In order to cope efficiently with the problem of uniformly treating the large number of cases of venereal disease, it was found desirable to establish an Army Venereal Disease Treatment and Diagnostic Center. This center comprised a mobile section of a Medical Laboratory (one officer and five enlisted technicians) and a 250 bed hospital unit (improvised from an Army Medical Battalion Clearing Platoon).

The treatment of VD in such a center proved most efficient from every angle. It also proved to be the most practicable means of providing quality treatment in quantity, and served as a helpful guide for the care of venereal disease patients in all Army medical installations. During the fall and winter months, when the refrigeration of Penicillin was not a problem, the treatment of gonorrhea at Division Clearing Stations proved practical.

7.   Neuropsychiatric Hospital

A 250 bed hospital unit was established as a Neuropsychiatric Hospital. This relieved the several evacuation hospitals from the necessity of treating neuropsychiatric casualties. It also provided uniform practices in the management of these cases.

The holding of such cases in evacuation hospitals where all types of casualties were treated tended to fix the anxieties of the psychiatric casualty and to predispose him to believe that his illness was of an organic nature. Often the diagnostic procedures and treatments had to cease when urgent needs for surgical beds required that such patients be evacuated to base installations.

At the Neuropsychiatric Hospital an attempt was made to minimize the hospital atmosphere and to foster the notion that it was a modified rest center. There were no nurses, pajamas, sheets, mattresses, pillows or pillow-cases. Patients slept on regular cots. Bathing facilities were provided. The idea of returning to duty was constantly kept before the patient as the terminal point of his stay in the installation. Officer patients were kept in the same wards as the enlisted men and were often helpful in returning enlisted casualties to duty. The number of the psychiatric patients leaving the Army area was reduced, and the period of hospitalization shortened. An additional important function of this unit was the preparation of psychiatric opinions on disciplinary cases.

8.   Division Psychiatrist and Division Rehabilitation Center

It was shown that if the treatment of neurosis was undertaken at an early hour in close proximity to the physical conditions against which the soldier reacted there was a greater chance of the soldier recovering rapidly and returning to combat duty. Treatment within the Army area also reduced the replacement problem.

The treatment of these cases in the division was directed by the Division Psychiatrist. Treatment and reconditioning was often possible within the regiment. If no visible improvement occurred at the end of a forty-eight hour period within the regiment, the patient was evacuated through medical channels to the division clearing station where the Division Psychiatrist took direct charge of the case.

If, after two days of therapy, there was satisfactory improvement the patient was transferred to the Division Training and Rehabilitation Center located in the vicinity of the division clearing station. If the therapy was unsatisfactory, the patient was transferred to the Army Neuropsychiatric Hospital. As a general rule most of the men were ready for duty following the second day at the division training and rehabilitation center, where a program of physical conditioning, supervised rest, and tactical training was carried out under the direction of experienced line officers.

The Division Psychiatrist, closely associated with the training staff, examined all cases before their return to duty, and when necessary recommended continued rehabilitation or evacuation for further treatment.

The Division Training and Rehabilitation Center was also used for troops returning to duty after hospitalization in rear areas. There these men were screened by a medical officer and by the psychiatrist in order to determine their fitness for combat.

9. Use of Field Hospitals as Surgical Hospitals

Augmented Hospitalization Units of Field Hospitals were used as Surgical Hospitals. Generally one Field Hospital of three units was attached to each army corps when engaged. This allowed the Corps Surgeon to employ the units as required by the tactical situation. They were placed near division clearing stations to provide surgical and post-operative care for non-

transportable casualties who could not otherwise survive evacuation to hospitals further in the rear. Teams of the Auxiliary Surgical Group were attached to these units to expedite the provision of surgical care for the seriously wounded who required time-consuming operations. This procedure resulted in a reduction of mortality rates, and enabled Evacuation Hospitals to accept for treatment a larger number of less seriously wounded casualties, and to expedite their treatment.

Usually, four general surgical teams and one shock team were required for an active Hospitalization Unit. Hospitalization Units leap-frogged one another in maintaining close support to advancing troops.

10. Army Dental Clinic

To meet a definite need, an Army Dental Clinic was established to produce the unexpectedly large number of dentures required. An average strength of 6 dental officers and 16 enlisted dental technicians proved adequate for this installation.

By pooling the dental officers and enlisted technicians of the Army Medical Battalions and by the utilization of dental officers and enlisted technicians from other units, a dental prosthetic laboratory and general dental clinic was formed. One hospital ward tent was used for dental prosthesis; one for general operative dentistry; one for admission, waiting and records; and one to house those soldiers on a quarters status who were stationed many miles away and for whom it was uneconomical and impractical to arrange daily visits to the clinic for the production of their dentures.

By this pooling of dental personnel, the quality and quantity of dental work benefited considerably, the days the patients lost from duty were reduced, and transportation was conserved.

11. Reserve of Medical Units

Available medical units must be utilized in such manner as to insure flexibility of operation. Needs for additional beds and

increased evacuation requirements often arose which were far beyond the normal expected in combat. Unless a reserve was constantly maintained the medical service would have been seriously affected during these peak periods. Original planning must envision this fact.

12. Selection, Demining Preparation, and Protection of Hospital Sites

Army medical units were placed as far forward as the tactical situation allowed.

Liaison was maintained with the G-3 and G-4 sections and information obtained regarding the location of supply dumps, gun emplacements or other installations which might prove a target for enemy fire. After a site was selected, clearance was obtained from the Army G-4, or from the Corps G-4 if the medical unit was to be established forward of the Corps rear boundary.

In selecting a new site, a ground reconnaissance was made of the area by a representative of the Army Surgeon's Office, the commanding officer of the medical unit concerned or his representative and an officer from the Army Engineer's section. The Engineer was consulted on drainage and road requirements. During the winter and spring months service roads were constructed prior to the movement of the unit to the site. Buildings used for Army medical units were often later occupied by Base section medical units.

As the need arose, particularly in periods of rapid advance, two teams of mine detecting personnel were placed at the disposal of the Army Surgeon. They demined areas and neutralized booby traps on sites or in buildings to be occupied by medical units. During the Anzio operation, hospitals were protected from enemy shell or bomb fragments by digging in ward tents and lining the walls with sandbag revetments held in place by chicken wire and iron stakes. Within the ward tents, sandbag compartments were erected

515

for groups of patients, thus reducing still further possible damage from shell or bomb fragments. Operating rooms were given additional overhead protection by means of roofs constructed from heavy planking covered by sandbags.

13. Employment of Corps Medical Service in Evacuating Division Clearing Stations

An Army Medical Battalion was attached to each Corps as a standard procedure. The Corps Medical Service, organically without the facilities of a medical battalion, was charged with the evacuation of division clearing stations to Army Evacuation Hospitals. Requests from the Corps Surgeon for additional ambulances to meet operational requirements were filled quickly, and upon the termination of their need these ambulances returned to the Army Surgeon's control. The evacuation of clearing stations of the divisions in this manner was established as routine and proved entirely satisfactory.

14. Evacuation of Field Army Hospitals to Base Sections

In Italy the Fifth Army always assumed the responsibility for the evacuation of its hospitals to the pertinent base facility whether it was a fixed hospital, hospital train, hospital ship, or holding hospital at air or sea base. Facilities were available in Army to accomplish these operations satisfactorily. This means of evacuation of Army hospital installations was used throughout the Italian campaigns.

15. Evacuation by Hospital Ship

When port facilities were available, loading of casualties onto a hospital ship was not a problem. When port facilities were not available, LCTs proved to be the most practicable

intermediary evacuation craft. Inclement weather and sea swells presented a serious hazard in transferring patients from LCTs to a hospital ship. At times loading was impossible. Masters of ships determined the distance off-shore that they would anchor. There was wide variation in practice which made the logistics of loading patients a separate problem for each ship.

Evacuation of casualties by LST was used only when air, land, and hospital ship evacuation could not be accomplished. This occurred during the Anzio beachhead operation and was never entirely suitable from the patient's or the Medical Department's standpoint. Organic facilities for feeding and for adequate medical care on the standard LST were unsatisfactory. It was always necessary to use additional medical personnel and equipment on LSTs carrying patients.

During the amphibious operations of the Fifth Army, evacuation by hospital ship was an extremely difficult problem from the Army viewpoint. In spite of every effort on the part of the Army Surgeon's staff there were many instances of confusion. Ships would arrive when not requested and vice versa. Closely coordinated staff work, especially between the controlling agency at AFHQ and the Navy, was essential to prevent such occurrences.

16. Evacuation of Casualties from Mountainous Terrain

It was proven again and again that only young, robust, well trained, strong-backed individuals could perform the gruelling task of moving litter casualties over the terrain which characterized fighting in Italy for the greater part of the campaigns. The manpower in the medical units of the divisions, with what help could be obtained from corps and army medical units, was often insufficient. It became imperative that most infantry regiments fighting in the mountains establish a central pool of extra litter bearers to provide litter teams where-

ever they were needed. Men organically assigned or attached to the regiment who were not otherwise tactically employed at the time were used. In mountainous terrain, where vehicles could not be used, the hand carried litter was shown to be the only practical means for evacuating the litter casualty.

17. Problems of Sanitation in a Limited Area

Operations in the Anzio beachead demonstrated very clearly the value of Engineer and Medical coordination as to sanitary measures in situations which present crowded conditions over protracted periods. Adequate numbers of incinerators, rubbish dumps, and wet garbage disposal points are necessary to prevent the dangerous accumulation of soakage, garbage, and refuse pits in unit areas. It was advisable to locate the sanitary installations away from congested bivouac areas. It was mandatory that individual units be continually reminded of sanitary measures by frequent inspections and constructive criticism of their areas by inspection teams.

18. Louse Control

At the end of the malaria season, a Malaria Survey Unit was used to take over the control of lice in the forward areas. Many troops occupied rooms in homes still occupied, or recently vacated by civilians. Bathing facilities were often non-existent for civilians, and it was not uncommon to find thirty living in one large room. As high as 30 per cent of the civilians in billets had body lice and as high as 90 per cent had head lice. Due to the severe winter conditions and to operational needs, it was necessary to billet some troops in civilian shelters. The Malaria Survey Unit visited every building in close proximity to military installations, and dusted, with 10% DDT powder, every civilian found. At the same time every civilian with a fever of undetermined origin had blood and fecal samples taken for laboratory examination to deter-

mine whether typhoid or typhus fever was the cause. Repeated checking and dusting were required, since undusted civilians continued to filter through the lines or to return from shelters in the hills. Louse control advice was given to the Commanding Officers of all units in the vicinity of the communities dusted.

19.   A Method of Venereal Disease Control

All prostitutes apprehended by the Military Police were incarcerated in civilian jails and examined for venereal disease by a medical officer. Vaginal smears and blood examinations were sent to the army medical laboratory. If a prostitute proved to have gonorrhea, she was treated for five days on sulfonamides, and then, if the smear was negative, the test was repeated three times before the prostitute was released from jail. In the case of an ulcer, darkfield examinations were made. If the blood serology was positive, she was given two treatments with mapharsen and then sent to the local civilian clinic for further treatment. Although this method of control was not entirely satisfactory, it was the best that could be done under existing circumstances.

Because of the unsatisfactory nature of available means of controlling the extensive prostitution, individual prophylactic measures were stressed with increased intensity.

20.   Trench Foot - Causes and Preventives

The incidence of trench foot in the Fifth Army during the 1944-45 season was approximately one-third of the 1943-44 incidence.

Trench foot was caused by exposure of the feet or hands to prolonged wetness and cold. The usual exposure required was three to six days, but with colder weather the exposure was often much shorter. The most important contributing factors were those which tended to impair circulation in the feet, such as immobility, tight leggings, tight shoes (due to poor fit, shrinkage from being wet, or wearing too many socks),

resting in a cramped position, and diseases of the peripheral circulation.

The responsibility of each unit commander for the prevention of trench foot was made definite. The Army Commander held division commanders strictly responsible for the curtailment of this preventable disease, suggesting that each company commander be required to report to his battalion commander, or other appropriate higher commander, each case of trench foot hospitalized from his company, stating the circumstances under which the case developed and whether or not it was possible to carry out all protective measures.

The following physical protective measures were put in effect:

a. All combat troops were issued shoe pacs to be worn with two pair of heavy wool ski-socks and a pair of felt innersoles;

b. All divisions made provisions to supply front-line troops with frequent changes of socks;

c. Drying and warming stations were established at appropriate places near the front-lines;

d. Front-line troops were given frequent relief from positions which kept them immobile.

Through the Army Surgeon, an intensive educational program was begun in advance of the trench foot season. All units were indoctrinated in trench foot prophylactic measures. Preventive medicine bulletins devoted to trench foot were prepared by the Army Surgeon at frequent intervals for distribution down to companies. Army Quartermaster officers conducted demonstrations in all rest centers on the proper use of shoe-pacs. Unit medical officers and company commanders conducted frequent inspections of feet and footgear.

A statistical control was established by having every patient admitted to an Army Hospital with trench foot fill in a questionnaire on the circumstances which preceded or accompanied the attack of trench foot. This questionnaire provided an index to the level of unit indoctrination in prophylactic mea-

sures, and the degree to which unit commanders and medical officers had advanced the trench foot control program. The Army Surgeon's office maintained a current compilation of this information by unit down to the company or battery. All division commanders required investigation of every case of trench foot by unit commanders to determine whether foot discipline was being properly carried out. Appropriate disciplinary action was taken where investigation revealed that failure to comply with control measures was the cause of trench foot.

21.   Supply of Blood in Forward Areas

A whole blood procurement and distributing unit (Blood Bank) was demonstrated to be an essential part of the base medical service.

In anticipation of the need for a greater quantity of blood in the forward areas than ordinarily supplied from the base blood bank, and because of the possibility of a failure of the daily arrival of the blood bank plane from the base area, an emergency blood bank was established in the army rear area. One officer and ten enlisted technicians operated the section of the Army Medical Laboratory used for this purpose when necessary. It was capable of drawing and processing 150 pints of blood daily.

22.   Medical Maintenance Units

Standard Medical Maintenance Units were found short or lacking in many essential items, and over in many others. To maintain balanced stocks, it was found necessary in submitting requisitions for medical supplies to request Medical Maintenance Units less the items for which there was no need, and to add to the requisition those desired items which were not included or which were present in inadequate amounts in the Medical Maintenance Units. Several proposed changes to the Standard Maintenance Unit were submitted to higher headquarters.

23. Protection of Medical Supplies in an Amphibious Operation

Discarded waterproof fiber containers for shells were found very convenient and practical to protect medical supplies in the initial landings of an amphibious operation. Small holes were punched in the metal rims at the top and bottom of the container. The hooks of the strap contained in the Medical Enlisted Man's aid kit were placed in these, thus allowing the container to be carried over the shoulder. They were waterproof, comfortable to carry, were durable, would float, and could be obtained in various sizes. Each container carried a balanced assortment of supplies most needed in the initial stages of the attack.

24. Requirements for Nurses

During heavy fighting additional nurses were required in all army hospitals to administer adequate care to the patients who were predominantly surgical. It was necessary to plan for the shifting of available nurses from rear (base or evacuation) hospitals to forward hospitals to meet peak loads of battle casualty admissions. Base sections were always able to fill the requests for additional nurses; however, transportation difficulties often delayed their arrival beyond the period of urgent need. The shortage of nurse anesthetists was partially overcome by selecting nurses from Army medical installations to attend a three month course in anesthesia at a school operated by the Base Medical Section.

25. Connecting Ward Tents

Heating, blackout, and professional care were facilitated by connecting two or more standard hospital ward tents end to end or by placing a pyramidal tent in the center with the end of a ward tent connected to each side. Connected tents were especially useful in the surgical section of evacuation

hospitals in inclement weather. The shock tent, x-ray tent, operating tent and post-operative ward were often arranged to provide all-round cover. In the Hospitalization Unit of the Field Hospitals, when used as surgical hospitals, the use of four ward tents connected to a pyramidal tent in the center became a standard procedure.

26. Increasing the Mobility of the Dental Service

To facilitate the dental care for combat troops, mobile dental dispensaries were constructed employing the bed of a 1-ton trailer as a carrier. Five such trailers were authorized for each infantry division and seven trailers for every armored division. The detailed plans for construction were made and distributed to the units. In addition, each division constructed and maintained a mobile dental laboratory mounted on a truck. These were all fabricated from salvaged materiels.

27. Medical and Dental Care at Rest Centers

The operation of medical and dental clinics at rest centers proved to be effective and efficient. Provision of such care at these centers aided the physical and mental recuperation of the restees. In addition, the treatment there given often took care of minor ailments which if left unattended would have developed into time-consuming cases. Medical personnel to operate this service were not provided in any overhead organization. Since Rest Centers are a demonstrated necessity, provision should be made for adequate personnel in an authorized organization.

CHEMICAL WARFARE

CHEMICAL WARFARE

1. The 4.2″ Chemical Mortar

The 4.2″ Chemical Mortar proved itself an invaluable weapon when used in direct support of infantry troops to neutralize enemy strong points and to lay smoke screens. Its greatest value lay in its accuracy and the terrific mass of fire it could place on a target in a short space of time. Initially, white phosphorus shells were used only for spotting targets and smoke screening, but later they were also used very effectively as incendiary and as harassing and casualty producing agents to burn the enemy out of well dug-in positions. The combined use of HE and WP was most effective.

The matter of tactical control of the fire of chemical mortar units, a somewhat controversial subject, was settled very early in Italy in favor of the supported Infantry. While at times it was advantageous to tie the 4.2″ mortar fire into the artillery fire plan, such occasions were far outnumbered by the requirements for quick and accurate fires at the call of the Infantry. The fewer the communication channels, and the fewer persons authorized to make decisions as to delivery of desired fires, the better was the final result. Practically without exception, companies, and at times even platoons, were attached directly to RCT's and operated as a part of the Infantry fighting team. A frequent variation was the mutual planning of massed fires by 4.2″ mortars attached to two or more RCT's on a single important target, but always with the provision that the 4.2″ mortar unit should revert on completion of the fire mission to control of the unit to which it was attached.

Due to the habitual shortage of Chemical Mortar battalions, ideal tactical employment of the 4.2″ mortar was seldom possible, as the mortar battalions had to cover wide fronts for several divisions simultaneously. This being the case, individual mortars were required to fire on separated targets, even

though it was realized that massed fire by platoon, company, or battalion was more destructive. This would have been obviated if a Chemical Mortar battalion had been available to support each infantry division.

The 4.2" mortar was only semi-mobile, and a roadnet into the mortar position was necessary for maximum employment of the weapon. In a fast moving situation, displacement of the mortar to accompany the foot troops was usually difficult, especially over rugged terrain. This weapon, normally transported by mortar cart or in a jeep-towed ¼-ton trailer, required as many as thirty mules per mortar platoon to maintain an ammunition supply to some of the mountain gun positions.

2.   Smoke in Italy

Prior to the spring of 1944 smoke was used mainly for port and beachhead screening during enemy air activity at night. For example, over the port at Anzio alone some 85 hours of smoke was produced for this purpose. Later, large area daylight smoke screens, known as a daylight haze, were used. These daylight screens denied the enemy observation of our activities, and prevented artillery adjustment on bottlenecks such as bridges, crossroads, and ship anchorages. In addition to facilitating the movement of supplies into forward areas during daylight hours, large troop concentrations were able to assemble within enemy artillery range with only a smoke haze between them and the enemy observation posts.

For front line cover, such as screening patrols or covering an attack, smoke was laid down by the 4.2" chemical mortars. With the development of the portable M-2 and the improvised Besler Navy-type generators, it became possible when wind conditions were favorable to use mechanically made smoke to assist in front line smoke missions. For the above-mentioned screens the following types of smoke generators were employed: the Esso M-1, the Besler M-2, and the Besler Navy-type. In all cases, the smoke lines were reinforced with smoke pots to take care of generator failure or adverse wind

conditions. Some advantages of the mechanical smoke generators over the smoke pots were as follows: larger volumes of smoke, fewer smoke points, fewer personnel required, and the absence of toxic effects on friendly troops, which was often the case with smoke pots.

3.   Flame Throwers

Flame throwers were used infrequently in the Italian Campaign. They were used for street fighting at Cassino, on the breakthrough from the Anzio beachhead, and in the Apennines. The portable flame throwers were used in this type of work. At times they were used by improperly trained crews, and the operator, not properly covered with protecting fire in his approach, seldom got within striking distance of his target. There were some cases where vehicle flame throwers were used, but most of the Italian terrain was not suitable for such use.

With two hours training any Infantryman became sufficiently familiar with the M2-2 flame thrower to be able to fire it. For maximum employment of the portable flame thrower, each infantry regiment should train many flame thrower teams. These teams should be used only after they have been well briefed on the target to be attacked.

The British Eighth Army made very little use of flame throwers in their advance north to the Po Valley. However, in their operations on the Lombardy plains during the winter of 1944-45 mobile flame throwers such as the CROCODILE and the WASP were very effectively used in assaults on pill boxes, fortified houses, dug-outs, and entrenched infantry.

4.   CWS Ammunition Detachments in Ordnance ASPs

As far as possible chemical depot detachments were maintained in the ASPs serving the chemical mortar batta-

lions and the smoke generator companies. CWS Depot personnel was furnished, within the limits of availability, to major Ordnance ASPs.

5. Through Routing of CWS Supplies to Using Units from Base Depots

Under certain conditions it was possible to save much handling and transportation by the direct routing of supplies from Base depots to using units. One of the principal examples of this procedure was the handling of fog oil for smoke generators. Under the old system, this item was handled as a Class V item and was issued from ASPs in the Army areas to the smoke companies. Inasmuch as this meant unloading from Army transportation into ASPs and the sending back of unit vehicles by the smoke companies to the ASPs for the oil, it appeared that a worth-while saving could be accomplished by a direct supply line. Convoys of fog oil were loaded at the Base depot, and routed through the Army and Corps areas, making delivery at the company supply dump. In this way many miles of travel by already over-taxed transportation were saved, and the actual man-handling of the oil drums cut to a minimum.

6. Winter Operation of Smoke Generators

The winter of 1944-45 found smoke generator companies with the Fifth Army working in the most northerly climates thus far experienced and, for the most part, in mountain locations. Since the smoke generators used large quantities of water, the problem of freezing of equipment arose in the winter months. Unfortunately, available supplies of denatured alcohol or other anti-freeze agents were extremely limited in Italy, and the recommended procedure of mixing anti-freeze with water for operation could not be considered. A compromise was worked out whereby an anti-freeze agent

was introduced in the water system during the closing minutes of operation each day and allowed to remain in the machine during the night. By careful attention, no equipment losses due to freezing occurred during the winter. It was found that during actual day operation, the machines furnished enough heat to prevent freezing at that time.

7. Smoke Generator Maintenance

Large area smoke screening along the Fifth Army fronts necessitated long continuous operation of the mechanical smoke generators. As the machines were not originally designed for such arduous service, breakdowns were frequent. The limited supply of spare parts, mainly coils and replacement generators, made maintenance difficult, and only by cannibalization of broken-down generators was this unforeseen situation met.

8. Improvization of CWS Equipment

Short supply and rugged terrain conditions required much improvisation to meet field requirements for chemical service. A good example of this occurred the winter of 1944-45, in connection with smoke screening. In several locations where smoke was demanded, the terrain absolutely precluded any possibility of getting M-1 generators into position. At this particular time the entire working stock of portable M-2s was deadlined for lack of coils. By a fortunate circumstance a limited supply of Besler Navy-type generators was available in Base storage. To make these sufficiently portable to be man-handled into difficult positions, supply tanks were removed and the remaining machine mounted on a ¼-ton trailer. Equipped with hose lines to draw fuel direct from 50-gallon drums, these machines proved highly successful, and were regarded by many as a distinct improvement over either of the approved type generators.

9. Chemical Maintenance Contact Parties

Better chemical maintenance was provided by the employment of field contact parties to make minor third echelon

repairs at the unit locations, rather than requiring that damaged materiel be brought back to the maintenance shop by the unit. Items like the mechanical smoke generator would have been exposed to unnecessary damage by long hauls over bad roads, and "on-the-spot" repairs cut road travel to a minimum.

10. Assembly Line for Ammunition Modification

Due to the failure of certain types of ammunition in the field from various causes, it was necessary in several instances to modify large quantities of ammunition on very short notice. To do this with the maximum of safety and in a minimum of time, certain personnel were carefully trained in each individual feature of the modification, and the flow of ammunition and parts through this trained crew was made a production line operation. Instances of this type of operation occurred when 4.2" shell was reworked to use field-dried powder, when excessive corrosion of fuzes required careful inspection of shells in depots, and in the reworking of many thousands of M-14 incendiary grenades whose fuzes had proven faulty. On a smaller scale this method was used in the replacement of M-5 propellants on some 3,000 4.2" shells with M-6 charges, and in the repackaging of the shell in reclaimed fiber containers.

Chapter Fourteen

ALLIED MILITARY GOVERNMENT

ALLIED MILITARY GOVERNMENT

INTRODUCTION

Military Government of conquered, occupied or liberated territory as a distinct branch of our armed forces originated in this war. Planning and organization commenced in the United States and Great Britain and were continued in North Africa where applications on a limited scale were made in the field. When AFHQ was first set up it included a Civil Affairs Section (CAS) which later became the Military Government Section (MGS) and finally the G-5 Section of the Supreme Allied Commander's staff.

The first operation of AMGOT (Allied Military Government of Occupied Territories) as such, before the invasion of Sicily, was in Pantelleria under direct command of AFHQ.

As the Italian campaign developed, and changes occurred in the status of the Italian government, modifications of the original organization were made to suit new conditions. From the beginning, however, AMG (Allied Military Government) groups in the field worked under dual control in that operational command and administrative control was exercised by two different authorities.

In October 1943, MGS at AFHQ had four separate organizations under its command: (1) a Military Mission to the Italian government in Brindisi; (2) an administrative AMG headquarters in Palermo; (3) an operational AMG headquarters in 15th Army Group in Bari, and (4) an independent AMG in Sardinia. Fifth and Eighth Army AMG were under operational control of AMG 15th Army Group and under administrative control of AMG headquarters, Palermo.

During the winter campaign of 1943-44 these four higher headquarters were combined in one Allied Control Commission (ACC). Two liaison officers remained on duty at the former

15th Army Group headquarters, by this time known as head-quarters Allied Central Mediterranean Force (ACMF) and later to become AAI (Allied Armies in Italy). Fifth and Eighth Army AMG came directly under administrative control of ACC, though operational control remained with ACMF.

By the end of the summer campaign of 1944, ACC had become a partly civilian Allied Commission (AC) permanently located in Rome. A new operational headquarters, itself under dual control, was set up first as the Civil Affairs Section, HQ AAI, and finally as the G-5 Section, HQ, 15th Army Group. The senior officer of G-5 Section 15th Army Group was AC of S, G-5, 15th Army Group. He was also DCCAO (Deputy Chief Civil Affairs Officer) under administrative control of AC. The AC had as its President a civilian diplomat and as its Chief Commissioner a senior officer who was CCAO (Chief Civil Affairs Officer) directly responsible to G-5 Section AFHQ. Fifth and Eighth Army AMG were under administrative control of AC and their operations were coordinated by AC of S, G-5, HQ, 15th Army Group.

All G-5 and AMG groups in the field were, of course, under command of the Commanding Generals of the organizations to which they belonged. AC of S, G-5 Section, HQ 15th Army Group, advised the Commanding General and his staff on all AMG problems.

1. Organization and Planning

1. G-5 Section, 15th Army Group

a. No operational AMG headquarters, distinct from AMG administrative headquarters, were provided for in the AMGOT planning which preceded the invasion of Sicily in July 1943. Throughout August and September, AMG groups in the Armies were administered from the AMG headquarters in Palermo, the CCAO being represented at 15th Army Group headquarters by liaison officers. As Army AMG groups moved

northward on the mainland of Italy, leaving AMG headquarters behind in Sicily, the need for a forward operational headquarters became apparent and the first 15th Army Group AMG HQ was set up in October 1943 with some 20 officers under command of the CCAO. ACC was activated in November 1943, but was not finally drawn together into a unified headquarters until January 1944 at which time the battle line was static, headquarters of ACMF and ACC were adjacent, and the ACMF link was reduced once more to a liaison office. But in the summer and fall of 1944, as the Armies drew farther from Rome toward the Po Valley, lines of communication lengthened again. An attempt was made to solve this problem by holding frequent conferences, at intermediate points, between senior AMG and AC officers. Finally, however, to overcome difficulties of consultation a Civil Affairs Section was set up at HQ AAI which later became the G-5 Section of 15th Army Group.

    b. G-5 Section, 15th Army Group was staffed by four permanent officers with three AC officers attached. The four G-5 officers were: (1) the AC of S, G-5, who was also DCCAO, (2) an Executive Officer, (3) the Chief of the Civil Affairs Division, and (4) the Chief of the Economics Division. The three attached officers were: (1) a forward representative of the Displaced Persons and Refugees Sub-Commission, AC, responsible both to the Chief of the Civil Affairs Division, G-5 Section, 15th Army Group and to the Sub-Commission at HQ AC, (2) the Deputy Director (Field) of the Public Relations Branch, AC, responsible both to the DCCAO and to the Branch at HQ AC, and (3) an Assistant to the DCCAO.

    c. The Chief of the Civil Affairs Division was responsible for Displaced Persons and Repatriation; Education; Legal Affairs; Local Government; Monuments, Fine Arts and Archives; Patriots; Public Health; Public Safety; Italian Air, Land and Naval Forces Affairs; and War Materiels Disposal and Prisoners of War. The Chief of the Economics Division was responsible for Agriculture; Commerce; Finance; Food; Industry; Labor; Public Works and Utilities; Shipping; Transportation and Communications.

d. Of the four permanent officers of the G-5 Section, 15th Army Group, two (American) were carried on the Table of Organization (T/O) of 15th Army Group, and two (British) on the War Establishment (WE) of AC. Of the three attached officers, two (British) were carried on the WE of AC and one (American) on the T/O of 2675 Regiment.

2. AMG Fifth Army

a. While Fifth Army was still in French Morocco, shortly after the cessation of hostilities with the French garrison, civil affairs were conducted by a Civil Affairs Section whose principal function was to insure that the interests of the Army were not prejudiced by the French administration. In due course the name was changed to Liaison Section, to correspond with the name of a similar section at AFHQ.

b. When Fifth Army was preparing to land at Salerno, the Liaison Section became the planning group for AMG Fifth Army, which soon took the form it maintained virtually unchanged until the end of the Italian campaign. The Senior Civil Affairs Officer (SCAO) later became also AC of S, G-5, Fifth Army. He exercised technical control over the Civil Affairs Officers (CAOs) of Corps and Divisions within the Fifth Army, and also exercised similar control over the Regional and Provincial Officers of the Allied Commission who functioned within Army territory.

c. To assist him in his functions he had a Chief of Staff (finally designated as Executive Officer), and Operations and Administration Officers with assistants, in addition to a staff of specialists in Public Health, Public Safety, Justice, Finance, Economics, Industry, Supply, Education, Engineering, Agriculture, and Monuments and Fine Arts.

d. In each Corps of Fifth Army a similar though diminished structure obtained. The Corps SCAO had with him an executive officer and a small number of specialists. The size of the Corps Civil Affairs Section varied with the size of the Corps area. Divisions had one or two CAOs, according to need.

e. The AC of S, G-5, was the advisor to the Army Commander in matters affecting the civil population. The actual functions of Military Government were performed by AMG personnel attached to Corps and Divisions or organized into Regional or Provincial teams. When operations were in progress, Division CAOs took emergency action in the first instance to establish the elements of local government. Corps Civil Affairs personnel then carried the process of local government further, and at the earliest possible opportunity, under Army AMG supervision, requested the installation of Provincial teams. Provincial teams consisted of a Provincial Commissioner (PC) with assistants and technical advisers on law, finance and supply. These were the "permanent" Military Government of the Province, and when Corps Officers moved on, they remained until Military Government ceased and the Provinces were turned over to the Italian Government.

f. There were some variations to meet local conditions. Certain large cities were found to present special problems with which the relatively small Provincial staffs could not deal. In such cases, City AMG teams were set up under specially qualified field officers. Organizations of this type operated in Naples, Rome, Florence, Leghorn, Bologna and Verona.

3. *AMG Eighth Army*

a. Planning fell naturally into two sections: (1) policy and economics on a long term basis and (2) operations. Though (1) is not dealt with here, it should be pointed out that difficult localities often require modifications in an existing system and any such modification must be made known to the Military Government Branch of an Army in time to be put into effect before new territory is entered. Operational planning presented no difficulties in Eighth Army AMG because the intention of the Army Commander was always known in sufficient time before any operation commenced.

b. The main problems which faced Military Government in operational phases were (1) Supply, (2) Refugees, and (3) Civilian sick and wounded. Before any operational advance

took place an appreciation of the situation was made as regarded the total requirements of civilian supplies which had to be lifted from dumps in the rear, broken down into daily maintenance requirements, and also stockpiled for forward advances.

 c. Whenever possible, forward stockpiling was accomplished by rail through ordinary Army channels, but failing the availability of rail transport, programs of stockpiling at predecided places were worked out. Such places had to be on Army lines of communication so that in the event of the Army being called upon to lift civilian supplies it could do so on its normal Line of Communication.

 d. Dependent upon the degree of intensity of the operation, civil hospitals and refugee camps were cleared to enable wounded and sick refugees to be dealt with expeditiously and to avoid interference with or congestion on operational lines of communication. For this purpose sufficient Public Safety officers were made available.

 e. The organization and chain of command of AMG Eighth Army conformed to and followed the usual channels obtaining in the various military units under Army command. AMG formed an integral part of the Army Staff in the same way as the "A" and "Q" Branches did. It was split into two: one part with Main HQ and the other with Rear HQ, and both parts moved with and as part of the Main and Rear Headquarters. The branch at Main Army was kept to the minimum since it concerned itself only with policy and close personal contact with the forward units of Military Government situated with Corps and Divisions. The Branch at Main Army consisted of the Head of AMG Eighth Army (SCAO); a GSOI for operations and policy; and a Staff Captain for Military Secretary, Intelligence, etc. It was sometimes necessary to add an officer to deal with AMG functions peculiar to the military operational picture, and requiring close personal contact with forward units.

 f. At Rear Army HQ, AMG consisted of the specialist officers under command of an SOI. They included

specialists in Public Safety, Health and Welfare, Supply, Finance, Refugees and Displaced Persons, Internal Administration, and Monuments and Fine Arts. Specialists in Engineering, Labor, Industry, Education and Legal Affairs were normally drawn on attachment from Regions in rear.

g. It was vitally important that all AMG officers at Rear Army work in the closest cooperation with their equivalent Branches of the Army: Public Safety with DPM and GSI (*b*), Medical with DDMS and Supply with DDST and "Q".

h. Each Corps had attached to it an AMG LO who in turn had under command an AMG LO with each Division. These officers lived and moved with the formations to which they were attached. They were under command of their respective formation commanders for "operation" but for administration they came under command of Army AMG. It was usually necessary for the Corps LO to have a small staff consisting of a Medical Officer, a Public Safety Officer and a Finance Officer, but numbers were kept down to the absolute minimum required to do the work. The function of Corps AMG was more operational than administrative. The Corps AMG LO was responsible for all operational moves of Civil Affairs Officers (CAOs) during the advance and for dealing with emergency administrative matters. He also saw that CAOs given him by Provinces and Regions coming up behind were put into their proper locations as decided by the Provincial Commissioners. He also maintained liaison with the PCs, whom he installed into their capitals as soon as these were liberated, at which time administrative control of all CAOs in the Province became the responsibility of the PC, guided on operational matters by the Corps LO.

i. The number of CAOs in any Corps or Divisional area depended on geographical conditions. Numbers were never fixed on an establishment for each formation. While Corps and Divisional AMG LOs moved with their Corps and Divisions, CAOs did not. They came under command as operations required.

2. Training

1. Selection of Personnel

a. Efforts were made to select officers of the highest integrity, because in AMG work opportunities for corruption and speculation abounded. Since wide areas had to be covered, energetic officers were required, and as they were confronted with many varied problems they had to be industrious, painstaking and equipped with common sense and good judgement. Flexibility and imagination were also required. Patience was found to be a virtue if it were backed by determination. In many cases ends were best achieved by a sympathetic attitude based on human understanding, but nothing was accomplished without firmness. Neither advancing years nor physical disability were found to be disqualifying liabilities in officers whose vigor and mental alertness had not declined. It was an advantage to have travelled, a sense of humor was often invaluable, and as AMG officers were left very much to themselves they needed mature consciences. Personality and leadership were often more valuable than efficiency and drive, as was common sense as opposed to cleverness, when coupled with an understanding of human nature. Gullibility was a dangerous handicap. Impartiality and fair-mindedness were both most necessary.

b. AMG officers fell into two distinct classes: (1) Specialists, and (2) Military Government officers. Complete mastery of their subject was the greatest asset of the specialist officers. They had to know their job at least as well as the opposite number in the occupied territory. A military background was preferable, but not essential provided they adapted themselves to military methods. They were, in fact, technicians with goods to deliver. For them affability and an understanding of human nature were not enough. In the Public Safety Branch, police training in civil life was essential, and in the Legal and Public Health branches a knowledge of law and medicine was equally necessary. Military Government

officers had to have military background, and the best AMG officers were found to be the officers with the best military records.

c. Different races require different treatment and the ideal would have been to select officers specifically to deal with particular nationals. Officers with previous experience in colonial administration, and possessing some military background, were generally successful. But highly trained civil servants, despite their knowledge of local government machinery, often so lacked adaptability as to be almost complete failures.

2. AMG Schools

a. Instructors who were fully conversant with the practice as opposed to the theory of Military Government were found best. Instruction in theory was not ignored, and was used as a foundation, but instructors with experience were able to make it clear that practice often had to be at variance with theory. While specialist officers were available to instruct in their own subjects, their object was to let the Military Government officers know what they had to offer rather than attempt to convert them into specialists. Hard and fast rules of procedure did not work out in the Italian campaign. The best instructors recognized that though it was found perfectly safe to lay down certain principles, few problems could be solved by rule of thumb.

b. It was found best to recount actual experiences, solutions applied to specific problems and the result obtained, good, bad or indifferent. Instructors who attempted to convince students that they were infallible generally forfeited the respect of those students. The motif of the soundest instruction was the decisive importance of common sense and an understanding of human nature. Specialists subjects were most successfully introduced from the point of view of showing students how the machinery worked rather than teaching them how to work it themselves. The Legal side was, however, an exception to this, since the Military Government Officer himself had to

administer the law. Mock trails were just as instructive as visits to actual courts. Valuable periods were those devoted to practical instruction, i.e., putting the student in the position of an AMG officer and confronting him with type problems. Variety was found essential in AMG schools. Successions of lectures proved monotonous, and discussion and debates as well as practical demonstrations were used to break the monotony. It was found advisable to limit hours of instruction and to let the students do as they liked in their free time.

3. Operations

The organization and methods of operation of AMG behind Army boundaries were along AC rather than Army AMG lines, and are therefore not germane to this article. It was found in practice, however, as the Italian campaign developed, that the interests of Army and Regional AMG overlapped, and in the winter of 1943-44 an experiment in fusing Army and Regional AMG organizations in the forward Eighth Army area in Emilia Region was made, resulting in a highly successful joint operation under an organization summarized as follows:

a. The Military Government Branch of Eighth Army was to all intents and purposes united with the Regional AMG which would ultimately take over. In fact, there was never any sharply delineated "take over", but a continuity of cooperation from the outset.

b. Region was converted into the Administrative HQ of AMG and came under command of AMG while the territory of the Region was still being overrun. The Administrative HQ was set up in a convenient point in Army area, as near as possible to AMG HQ, Rear Army. If necessary, it could have moved forward as the Army advanced, but in practice it remained in its original location until the Regional capital was liberated. The Second-in-command of Regional HQ was given command of the SOI at AMG Rear Army.

c. The Administrative HQ was charged with the whole administration of the Army Area, with the following limitations: (1) all matters of policy were the responsibility of the SCAO AMG, and (2) all matters involving contact with military formations were dealt with by AMG at Main or Rear Army HQ. The calling forward of civilian supplies through "Q" Branch was, for instance, done through this channel.

d. The Provincial Staffs and Communal Civil Affairs Officers of the Provinces were placed in position by Army AMG, and came under command of the Administrative HQ acting on behalf of Army AMG.

4. Relations with Italian Government Territory

There was, strictly speaking, no relationship between forward AMG organization and territory which had been handed back to the Italian Government by AC after the stage of Regional administration. But as the Italian campaign developed and the Italian Government consolidated itself in Rome, it was found increasingly difficult to persuade Italians in Army areas to accept the necessarily strict Army AMG regulations. Radio programs and newspapers published in Italian territory found their way into AMG areas and the people did not always understand that decrees, laws and regulations in force in fully liberated parts of their country could not also apply to them at once. This was particularly true during the winter months of 1943-44 when the line of battle was virtually static for a long period and when the large numbers of troops quartered in Army areas made conditions extremely difficult for the civilians. AMG personnel met the situation with a combination of tact and firmness which prevented any disorders. It was found necessary to exclude Italian politicians from the area. Exceptions were made only for the gravest reasons, and then only by special permission in each case of the Army SCAO concerned.

5.   Organization of Allied Commission

a. The Allied Commission (AC) was the organization primarily responsible, under AFHQ command, for the administration of Allied Military Government in Italy.

b. Its headquarters were near or at the seat of the Italian Government and it exercised general administrative authority over all AMG elements in the Field. Operational AMG organizations in Army Group and Army areas have already been described. Immediately behind them, and often working with them, was another group of Commission organizations carrying on Military Government in Italy in that twilight period which followed the advance of the armed forces but preceded the turning over of occupied territory to the Italian Government. These were the Regional administrative teams which governed areas corresponding to the Italian "Compartimenti". Each Regional HQ was organized, on a reduced scale, along the lines of AC HQ, and under Regional HQ were Provincial teams which operated in the Italian Provinces normally governed under Prefects.

c. Under the President and the Chief Commissioner of AC was a Chief of Staff. The Commission was divided into four main sections: Political, Civil Affairs, Economic, and Establishment. Each section had a Vice President and Deputy Chief of Staff (the Political Section had two joint Vice Presidents, one American and one British). In addition to the four main sections were five independent sub-commissions: (1) Italian Air Force, (2) Italian Land Forces, (3) Italian Navy, (4) Communications, and (5) War Materiels Disposal and Prisoners of War. There was also a Public Relations Branch, responsible directly to the Chief Commissioner. The remaining Sub-Commissions were grouped in the Civil Affairs Section and the Economic Section as follows:

In the Civil Affairs Section: (1) Displaced Persons and Repatriation, (2) Education, (3) Legal Affairs, (4) Local

Government, (5) Monuments, Fine Arts and Archives, (6) Patriots, (7) Public Health, (8) Public Safety.

In the Economic Section: (1) Agriculture, (2) Commerce, (3) Finance, (4) Food, (5) Industry, (6) Labor, (7) Public Works and Utilities, (8) Shipping, (9) Transportation.

6. Personnel and Replacements

Personnel and replacements in Army AMG organizations were supplied by AC through normal administrative channels. The experience gained in operations showed that, in the main, the officers sent forward by AC were good. Detailed observations will be found in paragraph 2 (Training).

7. Supplies and Transport

a. The work of the Supplies Branch was the most important and difficult in AMG. On its effectiveness depended the successful operation of almost every other branch, Public Safety in particular. Supplies Officers had to be experienced men capable of dealing with an enormous range of highly complex problems affecting the well-being of hundreds of thousands of civilians.

b. Before the Sicilian and Italian invasions, Allied propaganda assured the civilian population more than an adequate food ration. AMG had therefore to meet a population whose expectations were high. However, owing to a worldwide shortage of shipping and to the high priority of the demands of the Armies it was never possible to import more than a minimum of requirements. The importance of using and distributing local resources, therefore, soon became obvious.

c. In principle the responsibility for food distribution and accounting was thrown on Italian officials, but in practice, particularly in the southern parts of the peninsula and in Sicily, the Civil Affairs Officers (CAOs) had to keep a sharp eye on supply matters. Nevertheless, the principle justified itself at later stages of the campaign.

547

d. The head of the Supplies Branch was the Senior Supplies Officer at AMG Rear Army HQ. He planned his requirements ahead for the areas he had to feed. These requirements were communicated to the Food Sub-Commission at HQ AC where allocations were made to AMG from base depots at Naples, Bari, Ancona, Leghorn, and other ports. As the war went on, advanced base depots were established and supplies brought to them by road, rail or sea transport. They were sited as far forward as was permitted by the road transport available to lift supplies from port or railhead. The lift from Base to army railhead was usually made through bids for tonnage through G-4 ("Q") at Rear Army HQ.

e. From advanced base depots, supplies were allocated by the Senior Supplies Officer to the Provincial Supplies Officers, usually for one month, on ration scales laid down by the Food Sub-Commission. Deliveries were by WD transport to limited numbers of supply points selected by the PSO and issued by him to communes through Italian organizations. The last step was always complicated by shortage of transport, and for some time by the inefficiency of the Italian organizations and general popular distrust of them. In emergencies, such as occurred after the Cassino Battle and the breaching of the Gothic Line, issues were made direct to communes from advanced supply depots. These emergency issues were a great factor in restoring civilian morale and in inspiring confidence in AMG.

f. Difficulties never overcome were (1) liaison with rear echelons, owing to slow and uncertain communication between operational areas and HQ AC, and (2) phasing in supplies from several different places and combining them in a single week's program for a single army railhead. This problem was partly overcome by the sympathetic cooperation of other Army branches.

g. Eventually the Italian population came to expect the minimum rather than the maximum. This, coupled with the simple needs of most Italians and the fact that the Germans

rarely got away with everything, enabled the Supplies Branch to avert starvation and even severe hardship.

h. Civilian transport in the Army Area was at all times in short supply. Spare parts and tires scarcely existed. This problem was aggravated in the early days by the fact that CAOs themselves had no transport. All units were anxious to acquire civilian vehicles and no provision was made to supply petrol for urgent civilian requirements. In the course of the final year of the Italian campaign these problems were met, but the quantity and quality of civilian transport remained poor. In the first few months Italian, and German army trucks, hearses, fire engines and ox carts were all pressed into service.

i. During the winter of 1943-44 the main weight of trucking for Army AMGs was carried by Army transport platoons and by Italian transport companies with Allied cadres attached to AMG and operating Allied WD vehicles. Their chief tasks were clearance of supplies from railheads, deliveries from advanced base depots to provincial supply points, assistance to Provincial Officers and CAOs, carriage of fuel, bridge-building materiels, grain, etc. Although there were many instances of good work under dangerous conditions, the divided control over the personnel interfered with efficiency. The static period which preceded the break-through into the Po Valley gave the provinces in the Army areas time to build up pools of civilian trucks (Autotrasporti) which took some of the burden off transport companies. At all times, both Corps and Divisions were generous in static periods in lending trucks for moving rubble, refugees, hospital equipment and firewood.

8. Local Government

a. The lowest level at which the Italian Government is represented is the Commune (municipality), and the affairs of the Commune, which is usually composed of a number of frazione (fractions), are controlled from the Town Hall (muni-cipio) by the Sindaco (mayor). The Sindaco's post is an honorary one and so is that of the vice-sindaco. The communal

Secretary, paid on a scale corresponding to the grade of the Commune, is the Sindaco's executive official, controlling the various public services. Law and order are maintained by the head of the Carabinieri (CCRR), who may be anything from a Captain to a Sergeant. The Sindaco is directly responsible to the Prefect of the Province and is sometimes called a "Commissario Prefettizio". In normal times the Sindaco is advised by a Communal Council of prominent citizens. The Fascist party organization formerly had considerable influence in communal administration, but unless the commune was a large one most minor officials paid little attention to politics. Minor civil servants and communal officials were generally poorly paid. This system of administration was maintained almost unchanged by AMG. The main difference was that the Communal Council was temporarily replaced by a Giunta Municipale, composed of representatives of the different political parties interested in restoring the life of the town. It was always AMG policy to govern through the Sindaco. In Sicily and Southern Italy, the CAO was often forced by circumstances to be almost a Governor.

b. With the advance into Central Italy the first Committees of Liberation were encountered, and, while the CAO reserved the right to appoint or dismiss Sindaci or other officials, in most cases the choice of the Committee was respected. During periods of rapid advance, many communes received only fleeting visits from CAOs and some were never visited at all.

c. The policy prior to the occupation of Northern Italy in the spring of 1945 was to dissolve the Committee of Liberation as soon as possible and to form a Giunta Municipale, chosen, pending the holding of elections, to represent the various political faiths and extraneous to the actual administration of the commune. The Giunta was, in effect, the Committee of Liberation under a new name. In the fractions, similar organizations were set up on a small scale under the name of "Giunta Popolare".

d. The policy was that as soon as possible civil administration should be carried on through normal Italian channels and

the CAO should be free from detailed administration. But the principle, established in Sicily, that he should be accessible to any civilian during certain hours of the day, was never abandoned.

e. AMG landed in Sicily with the destruction of the Fascist system in Italy as one of its principal objects. But there were many snags. CAOs soon found that many of their chief civilian officials had Fascist backgrounds. If no other suitable candidates were forthcoming, he informed the Security people that the continued services of those individuals were necessary to keep the commune running and to maintain law and order, and unless the man was blacklisted there was seldom any objection. If men worked hard and seemed anxious to collaborate in rebuilding the commune and restoring more normal conditions, they were generally kept on. The work of removing Fascists was a Security responsibility, though the CAO sometimes sought the advice of untainted leading citizens. The result of all this was that in the first few months AMG gained the reputation of maintaining Fascists in office and perpetuating the old system. As southern Italy was left behind the task of finding literate anti-Fascists with some administrative experience became easier, and a list was drafted of categories of officials to be immediately arrested or deposed. Perhaps the most helpful step was the adoption of an Epuration Policy by the Italian Government. News of this had a salutary influence on Fascist racketeers who might otherwise have tried to hoodwink the CAO into letting them continue in profitable jobs. About the same time Scheda Personale (political questionnaires) were prepared and handed for filling in to Sindaci, Vice Sindaci, Communal Secretaries and Postmasters, and later by the Province to Provincial officials. They were a guide to appropriate action. The existence of Committees of Liberation and of Partisans prevented the likelihood of prominent Fascists remaining in office. The Partisans had their own methods of epuration which were generally put into effect before AMG took over.

f. The Prefect is the Provincial representative of the

Italian State and as such he was more the concern of the Provincial Commissioner than of Army AMG. But as Army and Region AMG organizations drew together, the importance of the Prefect as an administrative official in Army areas increased, since the implementation of provincial orders and Italian Government decrees was enforced at an earlier stage. Under AMG the Prefect generally had to take a back seat, but his presence served to remind his subordinates that the Italian Government would one day resume its full powers. There were "career" Prefects and "political" Prefects. The career Prefects were selected by the Local Government Sub-Commission of AC and sent out to newly-liberated provinces where the Fascist Prefects had invariably fled northwards. But it was also possible for Provincial Commissioners to select important local figures as "political" prefects instead. It is probable that in many instances the appointment of local men as Prefects was preferable. The Italian people are accustomed to the issuing of almost dictatorial decrees by their Prefects, and the Questore (Criminal Investigation Branch) and CCRR are directly under his control. The successful working of the system must depend on the ability of the individuals selected as Prefects.

   g. The Committee of National Liberation (CLN) was part of a national anti-Fascist movement begun in July 1943 when all anti-Fascist parties joined to form the National Front of Liberation. It became a National Committee, 8 September 1943. Its main tasks were to combat the remaining elements of Fascism and to incite civilians to resist the Nazis either actively or passively. But the war did not take the turn they expected, and Italy, instead of falling quickly, became divided into Enemy and Allied Occupied Territory. No CLN as such was encountered by AMG before the summer of 1944, though sometimes Giuntas, with much the same objects, were found or formed. In the more urban parts of Italy many intelligent and public-spirited CLNs were encountered. The main difficulty was when the CLN was not fully representative of all parties. In view of the weakness of the more legitimate forces of law and order,

it was perhaps inevitable that the CLN should have carried on a certain amount of "unfinished business". Prominent Fascists "disappeared", materiel was "requisitioned" and "voluntary contributions" were imposed. Before the arrival of the Allies, Partisans "borrowed" money and food to maintain themselves, and it was not surprising that the repayment of those "loans" was sometimes unorthodox. Considerable tact was needed in dealing with those problems.

h. Public meetings in Army areas were banned by Proclamation and parties were not allowed to publish or distribute notices. Nevertheless the CAO, on entering a town, generally found manifestos of every size and color pasted up and often clandestine newspapers on the streets. The calming down of high feelings, suppressed for a quarter of a century, often required great tact. The local groups recognized by the Italian Government were the Liberals, Christian Democrats, Socialists, Republicans, Communists and the Action Party. They were generally allowed to maintain offices. The Communists were the best organized. The Italians' love of talk and mystery made the formation of numerous small political groups inevitable. There were in fact dozens of unofficial little parties. The spreading of political propaganda was difficult in view of the lack of communications and many Italians were vague about the doctrines of the political groups to which they belonged.

i. AMG policy was to cooperate as closely as possible with the Church and to spare Church property from occupation by troops. The clergy were asked to help on welfare committees and with evacuees. Announcements of AMG policy on curfew, black market and similar subjects were frequently made from the pulpit. But the clergy did not play a part in AMG life commensurate with the importance of the Church in Italy. Priests rarely visited the CAOs unless they wanted favors. This does not mean they did not do their duty, but rather that they considered themselves to be representatives of the Vatican, a neutral state, and of the Catholic Church, an international body. They had to be good diplomats and they did not care to involve themselves too closely with any

temporary government, whether it was German or Allied. There were many instances of heroism and sacrifice by the clergy and of valuable and unselfish assistance to the sick, to children and to refugees. Monks and nuns, in particular, were of invaluable aid in hospitals and refugee centers.

9. Agriculture

a. Until AMG and Regions worked together under unified command, the reactivation of agriculture in Army areas depended entirely upon the farmers' own efforts and the keenness of Agricultural Committees formed to advise the CAOs. The CAO's share was usually limited to issuing needed permits of various kinds.

b. When Regional Agricultural Officers arrived, it was found possible to restore agriculture in Army areas to an unprecedented extent. There were many grave difficulties. War does untold damage to farms, roads, bridges, barns, houses, etc. The enemy invariably removed livestock, transport and machinery and left thousands of buried mines in the fields, orchards and roads. Two factors were particularly helpful in the Italian campaign, (1) the *contadino's* tenacity in carrying on under the greatest difficulties and even under fire, and (2) the sympathy and help of all branches of the Armies which made possible the preservation of livestock and allowed farmers to go on working in all except the very forward areas.

c. The agricultural problem was twofold: (1) to save all possible foodstuffs from the old harvest, and (2) to plan and execute a planting program for the next one. The success of the program was dependent upon the ability of the farmer to get his work done, the provision of seed and fertilizers, the publicizing of the program, and the willingness of the farmer to cooperate. To meet the shortage of tractors and oxen, "Help-your-neighbor" policies were instituted, in some places by decree, in others by good-will. Machine shops were set up to repair tractors, fuel was obtained through normal channels, and screening and coupon systems were set up by the Agricul-

tural Inspectorates. Seed requirements were surveyed, seed was selected and cleaned, and in the sowing season of 1945 no ground remained idle for lack of seed. Fertilizer was issued for the priority crops (wheat and vegetables), and a special consignment for hemp was brought up. The program was publicized by PWB and the farmers were found anxious to carry it out when they understood it.

d. The formation of schools to teach mine-clearing was late getting started, but they operated successfully in the spring of 1945. Mine lifters were given special rations and rates of pay, and pensions for injuries received.

e. Reformation of Italian agricultural offices and departments was carried out as soon as possible under Regional and Provincial supervision. The difficulties encountered were mainly insufficiency of transport, lack of records, political unsuitability of personnel, and lack of accommodations. Efforts at reform were, in the main, successful and national policies were applied in Army areas in 1945 at a much earlier period than was hitherto thought possible or desirable.

10. Commerce

Trade, either internal or international, was not considered by Army AMG groups to lie within their province. Commercial projects could not be planned or undertaken without consent of AC. Some attempts to encourage or to limit inter-provincial trade were made from time to time in Army areas, but the general lack of transport made stimulation difficult, and other factors impeded control. Operations depended largely on the use of military transport, and were limited therefore to exchanges of surplus commodities.

11. Finance

a. In the early stages financial institutions were always closed to prevent runs on them. Large sums of money were given to CAOs to finance institutions in urgent need and to

re-establish some semblance of normal conditions. But few CAOs were experienced in either finance or accounting and eventually AMG Finance Officers were attached to Army and later to Corps AMG.

b. The original system of advancing Allied Military Lire from town to town as the Armies moved on increased cash in circulation and helped inflation. Funds had to be replenished constantly from AFA (Allied Financial Authority) sources. During rapid advances both time and cash were often lost. Ultimately the method was changed as follows. The Finance Officer continued to advance cash as needed, but on reaching a Provincial capital he met with approved civilian finance and Treasury officials and all advances made to Provinces were integrated within the Italian fiscal system. The monies advanced were then reimbursed from Italian State funds and the receipts handed over to the Italian fiscal authorities. The results of this change were that (1) the amounts of AM Lire put out by Finance officers became almost nil, (2) advances to communal, provincial and statal bodies were on a more or less normal basis, (3) control of expenditures was facilitated because all Italian facilities and personnel were put to work, (4) the Financial Officer no longer needed to carry large cash reserves since his fund had become a revolving one, and (5) demands on AFA funds became unnecessary.

c. Fighting units often occupied bank premises in the early days of the Italian campaign, sometimes after the operational need had ended. This practice was stopped under AAI instructions, and AMG was then able to count on having the use of banks at an early date.

d. A standard drill for re-opening banks was developed. On his initial visit to a town, the Corps Finance Officer invariably called together the bank directors, and inquired into their cash position, the conditions of bank premises, the adequacy of the bank staff, and the names of all Bank Directors, for submission to the Security people. The date upon which the banks were to re-open was determined by his findings. Experience

showed that all banks in a community must be reopened at the same time. When one or two banks lacked the funds to re-open a loan was arranged between the "haves" and the "have-nots". Undesirable directors were replaced by vice-directors or other competent officials of the same bank. In the latter part of the campaign banks were usually re-opened within 10 days after liberation.

e. Fascist Republican laws restricting bank withdrawals gave rise to a low cash position in most banks and to large private holdings of currency. AMG advised banks to publish the fact that withdrawals were no longer limited and in almost every case cash flowed back.

f. By General Order, posted by the CAO on entering any commune, the continued payment of national, provincial and municipal taxes was ordered, and banks were authorized by Proclamation to permit withdrawals from accounts for payment of taxes. Collection of taxes during the early phases of Military Government was difficult. In many communities tax rolls had been destroyed. In the more primitive parts of Italy the villagers took the overthrow of Fascism to mean that taxes were also abolished. In some communes banks were the tax collectors, and sometimes these banks were not re-opened for some weeks or months. Sometimes troops occupied tax offices and used them for indefinite periods. Tax adjustment on land or on destroyed or damaged houses also was extremely difficult.

g. Italian post offices acted as paying agencies to the various Ministries for state pensions, primary school teachers' salaries, social insurance grants and military subsidies. They also paid the public debt coupons and interest on nominal bonds. There were post office current and savings accounts. It was therefore necessary to re-activate post offices at the earliest possible date. Military subsidy rolls were checked, forms for pensions and salaries were inspected, and authority was given to re-open for those purposes. If necessary, cash was advanced, The early resumption of payments on coupons, bond interest and current and savings accounts was not practicable, however, because of the breakdown of the postal services proper.

h. During the first stages of occupation delays occurred in the payment of salaries and pensions owing to the disorganization of communications and paying agencies, destruction of records, dispersal of office staffs, and the flight of the recipients. In the early days of the campaign it was the practice to give relief through the commune rather than to pay military subsidies, but it was soon realized that the subsidies formed such an integral part of the Italian financial structure that their payment had to be resumed.

i. Difficulties arose out of decrees published by the Fascist Republican Government authorizing payment of salaries in advance deductible over a long number of years, bonuses, and increases in salary scales.

j. Payment of salaries to officials suspected of Fascist sympathies, arrears of salaries prior to Allied occupation and salaries of refugees without proper documents were not considered AMG responsibilities in the initial phase of operations. Pending settlement at later stages, assistance to persons in these categories was given, in cases of urgent need, out of Ente Communale di Assistenza (ECA) funds, administered by the communes.

12. Food

a. Importation of foodstuffs, transfers of food stocks from territories long liberated to other parts, and the fixing of ration scales were matters for AC action. However, Army AMGs had many food problems in their areas and considerable experience in meeting them was acquired. The theory that laws of supply and demand would settle the problems of food, food distribution and food prices had to be abandoned at an early stage.

b. Supervision of amassing of grain and olive oil was a Provincial rather than an Army AMG responsibility. The Fascist amassing procedure and machinery were largely continued by the AC, though the word "Amasso" was dropped for "Granai del Popolo" under pressure from the Public

Relations Branch. In areas where inflation had already begun and where there was no surplus of the commodity to be amassed, CAOs were often compelled to take strong action to prevent essential foodstuffs from being hoarded or disposed of on the black market. Coordination of Army AMG and Regional organizations helped Army AMG to meet some of the problems of civilian feeding. The main difficulties found were (1) grain was sometimes wet and unfit for storage, (2) many stores were roofless or ruined, (3) numbers of stores were occupied by troops; particularly in static periods, (4) farmers were restricted from moving grain by travel limits in operational zones, (5) Italian agencies were often reformed with difficulty, and (6) Partisans had advised the people not to bring in their grain for fear the enemy would confiscate it (a fear seldom justified).

    c. A partial solution was found in the rural areas by moving the grain by ox-cart to the nearest "Granai del Popolo" within the three-kilometer limit and then transporting it to large silos in the town, in AMG or Autotrasporti trucks. All grain offered for sale was bought as quickly as possible, and stored on the farms themselves if necessary. Teams were sent out at the earliest possible date to check all grain before the farmers had time to hide it and say the Germans had carried it off.

    d. Naval regulations restricted fishing off the Italian coasts, sometimes for months on end, but in many instances, when considerations of security permitted, fishing fleets operated even under shell fire. Equipment was generally in poor condition and the enemy did his best to destroy the boats. The catch was seldom enough to feed the commune and there was a tendency to sell fish at high prices in quiet corners. Zoning schemes were tried to arrange distribution on a limited but fair basis. The Army sometimes supplied fishermen with fuel and oil in exchange for a proportion of the catch.

    e. Price fixing was a difficult problem, though controls of various kinds were enforced throughout the campaign. Early efforts to freeze all prices at pre-invasion levels failed completely, and the final aim was to control only necessities and

imported goods. Maximum price schedules for foodstuffs were published periodically by Army AMG headquarters, and within these ceilings provinces fixed their own maximum prices. CAOs, also, were responsible for fixing prices in their communes. It was found that even a faulty system was preferable to no control. Restrictions on movement interfered with black market operations, though many evaded the laws and obtained high prices from clandestine dealings. It was found impossible to maintain low prices in areas adjacent to those in which prices were unchecked.

f. Ration scales were fixed by HQ AC but were often an unattainable ideal. Two important items in all scales, pasta and oil, were always difficult to provide. It was sometimes necessary to hoard supplies in areas where there was a great demand in order to meet future commitments, but that policy inevitably led to discontent among the civilians who had to go short. Various ration scales were introduced for different classes such as heavy workers, hospital patients, prisoners, certain categories of refugees and forest guards. Particular attention was given to the distribution of special rations for heavy workers, since the Army was directly interested. It was our policy to make communes responsible for the enforcement of ration scales.

13. Industry

a. In the general interest of the war effort, important raw materiels were brought under control as rapidly as possible and factories which could be repaired and set to work were protected against unnecessary damage. However, in order to provide hard standings for military vehicles plants were almost inevitably occupied for varying periods and considerable damage was done to stocks. Small stocks of important materiels not declared by the owners were often removed by persons unknown, both soldiers and civilians. Adequate protection was very difficult.

b. To try to protect essential raw materiels General Orders were produced, warning units of their responsibilities in the proper use of such materiels and ordering all manufacturers to declare to AMG the condition of their premises and details of their stocks.

c. The activation of industry depended on fuel, which was controlled by the Armies, and so immediate production could be resumed only when the Armies were interested in the product. CAOs were responsible for forwarding details of industrial premises through channels to HQ AC, and industrial experts from Region or AC HQ were often of great assistance in the early stages in protecting industrial establishments from unnecessary damage.

d. For several months AMG depended for its gasoline, oil and lubricants on what could be secured from Armies by private arrangement, on what had been hoarded by civilians, and on finds of German and Italian dumps, until the latter came under control of DDST. During most of the last year of the campaign, these fuel items were drawn for communes by the CAO through Army channels, the Corps AMG LO being responsible for the accounting. But shortly before the opening of the 1945 Spring campaign an Italian civilian organization (CIP) was set up in each province and was made responsible for the handling of gasoline drawn from the Army. The CAOs responsibility was to make the initial bid and to ensure proper use. Fuel was released to civilians for milling and for vehicles, especially ambulances. Requests for kerosene were usually ignored except from hospitals. In the summer of 1944 lubricants and fuel needed for threshing arrived late, owing to a shortage of transport, but comparatively little of the harvest was lost.

e. Until the Po Valley was entered, electric power was usually non-existent. In the large towns it was always controlled by the Armies on a priority basis. Coal was unobtainable because it could not be hauled and small local stocks were usually required by Armies. The supply of wood fuel and charcoal was organized by AMG and controlled so as not to denude Italy of its timber reserves. There was never any

serious lack of liquid fuel drawn from Army sources, but all solid fuels were in short supply at all times.

f. The problem of requisitioning was never really solved in operational areas. In emergencies, units always made use of any materiels needed for the immediate prosecution of the war, such as brick, timber, coal, pipes, and glass. Time and correct forms were rarely available to complete a transaction between a unit and an owner, and often the owner was absent. Until 1945, AMG was regarded as the authority for allotment of essential materiels and many units thought a chit to the owner was enough. Army instructions on requisitioning ultimately cleared up the situation somewhat.

g. Blocking was resorted to in order to control materiels essential to both the military and civilians, and to keep them out of the black market. An experiment in control was made in 1944 but was not followed up. Later a representative from the Local Resources Branch of AAI was attached to Army, but relations between him and AMG were never very close. Instructions on blocking were issued to CAOs in July 1944 but were enforced reluctantly. Later instructions shifted some of the responsibility to G-4 at Corps and Army, and stores of essential materiels were blocked on behalf of the Army and in the name of the Commanding General. Unblocking required Army permission. Unfortunately the Army never had the personnel needed to protect all dumps of essential materiels. Finally, just before the break-through into Northern Italy, a General Order was drafted, defining essential materiels and requiring their immediate declaration on pain of severe penalty. Investigations were to be made by Italian officials appointed by CAOs.

14. Labor

a. The provision of labor to the armed forces was always an important part of the CAO's work. Regulations were scantily issued at first by higher formations and pay varied from a mid-day meal to a chit marked "AMG will pay". But from

1944 on, both AFHQ and AMG issued detailed regulations for the employment of civilians.

b. In most of the larger towns Civil Labor Offices were set up, and during the winter of 1944-45, after the services of Regional Labor Officers became available, much was done to place civilian labor directly employed by Armies, working on Army contracts, or privately employed, on a sounder basis than ever before contemplated. Cost of Living Bonuses, Social Security Grants, and Family Allowances were all introduced in Army areas.

c. Difficulties were encountered especially in the early days. Labor was urgently needed by the Armies for road building, and as waiters, cooks and interpreters. Civilians were generally not anxious to work immediately, and, while strong action was sometimes taken by CAOs to procure labor, the policy was to avoid methods which resembled those of the Todt Organization. Once the labor unions got into operation, civilian labor was generally enrolled in sufficient volume, though in some agricultural communities there were difficulties. Civilians were usually glad to work for the Armies and often did so at considerable personal risk. Lack of boots and clothing required by the laborers was always a problem, especially in the winter.

d. The "Camera del Lavoro" was not allowed to function legally in Army areas, but worked underground. The authorized labor organization was the "Ufficio Provinciale del Lavoro" operating under the AMG Labor Officer who, with his division, was concerned with the application of the labor policies of the Allied Commission and the Italian Government in so far as such application was feasible in Army areas. Orders abolishing the Fascist labor system were always issued immediately, and Regional, Provincial and Communal Labor Offices, staffed by Italian civilians, were set up to replace it. Their field covered registration and recruiting of workers, industrial relations and labor statistics, for the Allied forces as well as for civilian employment.

e. Labor unions were allowed to engage in collective bargaining in private industry even in Army areas, but they were not allowed to hold meetings or demonstrations until the Armies moved forward.

f. Social security agencies were started as soon as possible, in conjunction with the Finance Divisions, for the provision of assistance in old age, sickness, injury and unemployment for workers in either military or civilian employ.

15. Public Works and Utilities

a. During rapid advances the initiation of public works was usually left to Provincial and Regional officers, but with the amalgamation of Army and Regional AMG it was possible to accomplish a great deal of reconstruction. In large towns Army engineers assumed responsibility for carrying out emergency repairs to public services with the help of the Genio Civile. Waterworks and drainage were priority projects. Other emergency work depended on the amount of materiels required by the Army for its own use. Army engineers were sometimes rather hasty in requisitioning tools and building materiels, but their assistance to AMG with advice and trasport always outweighed any minor differences on that score. The Army often supplied water trucks and static tanks for the relief of urban civilians. Fortunately, in Italy, most communes were well supplied with wells and the sewage systems were generally primitive, otherwise the enemy's systematic destruction of pumps and aqueducts would have been far more serious than it was.

b. In communes outside the L of C, the Genio Civile was responsible for emergency repairs. The Italian government subsidized emergency housing repairs up to 10,000 lire. CAOs were responsible for advising municipal officials of the procedure to be followed. Estimates for long-term projects in Italy were difficult to make because prices rose so quickly.

c. With the energetic cooperation of Army engineers, the Consorzio Bonifica and the Genio Civile, flood control was

carried on in areas deliberately inundated by the Germans, and much flooded land was restored to cultivation in the spring of 1945.

d. As early as October 1943, in Eighth Army, AMG Roads Officers were appointed to effect liaison between military and civil engineers for the reconstruction of roads and bridges. During the first winter they were responsible for the registration, payment, and the furnishing of supplementary ration cards to the workers. These tasks were taken over in 1944-45 by the Civil Labor Offices and the Engineers. The main concern of the Roads Officers was to repair and rebuild the main military highways, but work was also done on side roads and bridges to enable civilian life to carry on. The great calls on Bailey bridging as the Armies advanced made the early reconstruction of permanent bridges extremely important. Labor problems involved food, clothing, transport, and the agricultural season. Except in very rare cases these road and bridge workers were not fed by the Army, but received a supplement of 200 grammes of bread a day. Some reconditioned boots were made available. Roadside labor, which could walk to and from the job, was preferred, but for large projects WD transport had to be used. Town labor was called upon for road work during the harvesting seasons of June and July. Uniformity of wages and their stabilization in adjacent areas were found essential; the level of the wage scale was less important than its uniformity. Materiel and transport were supplied by the Armies, but full use was made of local resources. Contracts for bridge building were arranged by the Roads Officers and were framed to induce the contractor to bring out hidden timber, brick, lime, cement, and machinery. Reactivation of brickworks was another responsibility of the Roads Officers in conjunction with Army Engineers.

e. Perhaps no industry in Italy was as hard hit by war as the electric power industry south of the Po Valley. It was singled out for destruction by the retreating enemy, the Allied bomber, and the partisan saboteur. That meant the paralysis of all industry, electrically-operated mills and water systems.

Army assumed responsibility for reconstruction and for priorities in Army areas, and was very sympathetic in allotting current for essential civilian installations such as hospitals and mills.

16. Shipping

Seagoing and coastwise shipping did not come within the scope of AMG activities in Army areas. Any use made of them for the movement of supplies or refugees was made through AC or military and naval authorities.

17. Transportation

a. Reactivation of railways tramways, and other transport systems on a large scale was primarily an AC responsibility, but in Army areas every effort was made to restore local traffic as rapidly as possible. Civilians were discouraged from using their decrepit vehicles on the chief military roads, but civilian engineers were given help to rebuild the minor roads and bridges.

b. Railways were a state monopoly and were invariably wrecked by the retreating enemy or by Allied bombing. Single line railways were built along the main routes under military supervision. Civilians were not permitted to travel on them, but they were used to back-load refugees and to bring up AMG civilian supplies.

c. The autobus system was once an important public service in Italy. Occasional buses were left behind intact by the Germans, but lack of spare tires made it hard to run them. Some limited bus services were started in rear army areas for civilians.

d. With permission from CMP, civilians were allowed to travel in WD transport, and AMG depended on this concession for the transportation of its civilian officials.

18. Communication

Telephone, telegraph, radio and postal services were all strictly controlled by Armies until they were handed over to AC. The lack of postal facilities hit civilians hardest, and a considerable volume of mail was carried illegally in spite of severe penalties imposed by AMG. The lack of communications facilitated the rise of rumors among civilians and AMG tried to combat these with the help of the Psychological Warfare Branch (PWB) which had highly mobile teams with each Army and worked closely with AMG on local questions of public information. The complete collapse of civilian communications was one of the greatest handicaps to efficient civil administration.

19. Displaced Persons and Repatriation

a. There was a Refugee Branch in each Army AMG to deal with refugees and refugee problems in Army areas, including their reception in camps, provision of accommodations, and evacuation to AC camps and holding centers. Italian refugees from the South, and Allied Nationals (except escaped Allied Prisoners of War) were handled through these departments. Local refugees were dispersed in neighboring communes or held in camps. The early practice of evacuating refugees right out of Army areas was discontinued, partly because transportation to and accommodations in the South were severely limited, and partly because splitting up families caused great hardship.

b. The organization consisted of: (1) forward refugee evacuation camps normally attached to Corps, (2) second line refugee camps, under Area control, operating as part of Army Roadhead, and (3) the office of the Senior Refugee Officer at Rear Army HQ. The Red Cross provided a representative responsible for administration of Italian Red Cross personnel and for distribution of clothing and other comforts. Each camp

was commanded by an Allied officer, assisted by a Senior Italian Officer, one or more junior Italian officers, two or more Italian Red Cross Sisters, an Italian Medical Officer, an Italian chaplain and the necessary number of Italian NCOs and soldiers. Carabinieri were provided to keep order, and G-2 had a security representative attached.

    c. Reception, maintenance and evacuation of refugees were finally regularized as follows: Evacuation from forward camps was through back-loading divisional or corps transport. On entering camp all refugees were registered, "vetted," disinfested and given any necessary medical care. Evacuation to second-line camps was through returning Corps or Army transport. Refugees have been regarded, since the 1940 campaign in France, as an Army problem, and AMG never experienced any difficulty in securing army transport to move them. The evacuation and holding camps allowed AMG to keep roads and areas clear of refugees during advances.

    d. Experience showed that the majority of Italian civilians were very reluctant to evacuate themselves or be evacuated by AMG. Their ability to "double up" in nearby areas when they were evacuated from combat zones was at first underestimated.

20. Education

    a. Until the winter of 1944-45 it was not thought practicable to open schools in Army areas, but this was finally done with good results in the rear zones. Further forward, with travel strictly held down and troops in occupation of buildings, the schools remained closed. The opening of schools served two purposes: (1) it helped keep children off the streets and away from troops, and (2) it enabled AMG to do away with Fascist school officials during the period of Allied occupation and to substitute able professional leadership.

    b. The Provincial and Regional Education Officers decided the date when schools might re-open and notified the Provveditore agli Studii who was an AMG appointee. As soon as the

Bank of Italy re-opened, teachers were paid through the Provveditore. Heads of schools were required to file a Scheda Personale with the Provveditore and those with unsuitable political backgrounds were suspended. Revised text books and school supplies were brought forward through AC channels, and directives for the approval, sale, price and confiscation of books were issued to book-sellers through the Provincial Prefects. Enforcement was a responsibility of the Communal Sindaci, who were also responsible for school buildings and for providing school lunches. When all the school buildings were occupied by troops, lessons were given in private homes, and religious institutions continued to educate homeless and orphaned children.

21. Legal Affairs

a. Allied Military Government was based on Proclamations and General Orders, and the CAO was the representative of the Commanding General in enforcing them. Posting of the Proclamations was the CAO's first official act on entering a commune. In the earlier days Proclamations were numerous and often hard to obtain; some were inappropriate, and not infrequently notices closing and re-opening banks were posted simultaneously. Proclamations and Orders were quickly removed by weather, passing traffic and children, or covered over with new orders, and CAOs usually forgot when and where they had been posted. To prevent confusion, copies of all Proclamations were later signed, dated and left with the Commune and the Carabinieri, and the Provincial Legal Officer was informed of the dates and particulars of posting. Local notices and announcements were usually signed by Italian officials with AMG approval, though for publication of an order which was not an extension of the Proclamations, consent from higher authority was needed. In the last year of the campaign, Provincial Orders and some decrees of the Italian Government were posted in Army areas, but normally implementation of Italian law did not occur until provinces passed under Regional control.

b. Having posted Proclamations, the CAO was empowered
to establish summary courts to try violations of them. At first
many CAOs were nervous of legal forms and procedures and
preferred the Police Officers to hold court. But simplification
of procedures and documentation made the work easier. The
great majority of CAOs were fully capable of holding Summary
Courts and giving the accused the impression that he was
getting a fair deal. All Summary Court sentences were reviewed
by the Senior Legal Officer and sentences were sometimes
quashed. Suggestions that scales of punishments should be
published were never carried out. Penalties sometimes varied
considerably in adjacent communes, but it was felt more
satisfactory to leave decisions to the judgment of the individual
CAO. Errors on the side of severity were not discouraged as
sentences could always be reduced but not increased. Italians
were accustomed to heavy punishments from their own courts.
With gradual inflation fines became less and less of a penalty,
but most Italians regarded prison terms as deterrents. The
majority of Summary Court cases were for violations of curfew
and travel restrictions. Possession of Allied property was
another violation often difficult to judge. Black market cases
were generally referred to civil courts. Considerable variations
were found in the application of the suspended sentence, though
most CAOs used it in cases of extreme youth, old age or illness.
Confiscation, particularly of civilian transport, was at the option
of the Provincial Commissioner. Summary Courts imposed
imprisonment up to one year and/or 50,000 lire. In default of
payment, 100 lire was taken to be the equivalent of one day's
imprisonment. In the Summary Courts the CAO generally
acted as judge, with the Civil Affairs Police Officer (CAPO) as
prosecutor. More serious cases were tried by Superior Courts,
imposing sentences up to 10 years and unlimited fines. These
courts were conducted by Provincial Legal Officers, who were
always trained lawyers. Some Italians viewed the prospect of
long terms of imprisonment with equanimity, believing there
would be a general amnesty when the Allies left Italy. The
most serious cases were tried before General Military Courts

of three or more officers, one of whom had to be a trained lawyer. They were appointed by the Army Commander or the SCAO. Spies and saboteurs arrested in Army areas were tried by AMG General Military Courts convened in the Army areas, with regularly assigned Prosecutors and Defending Officers.

c. Italian Courts were always reactivated as soon as possible. In Sicily large numbers of cases and prisoners were found untried, and some civil cases dating from the Messina earthquake were still outstanding. Several difficulties were encountered in reopening the Civilian Courts: officials sometimes fled to enemy occupied territory, court premises and records were often destroyed. But it was not uncommon for the first court session to be held within three weeks of the occupation of a Province. From 1944 onwards AMG began to allow Italian courts in rear of Corps boundaries to try minor violations of Allied Proclamations, such as curfew and circulation offenses. This took a burden off the CAO and served to educate Italian courts in Allied principles of justice. In primitive areas, CAOs, on the other hand, were asked to decide cases involving offenses against Italian law, but rarely did so. Under the Fascist Regime numerous cases were settled in Special Courts, and there is no doubt that even under Allied occupation many small disputes were settled by arbitration of the Giunta Popolari or Partisan heads. The reasons for this seem to have been general lack of communications, a long hiatus in which Italian courts failed to function, and the fear of reprisals engendered by twenty years of Fascism.

d. Many of the higher Italian legal officials were epurated, but most avvocati were only too anxious to cooperate with AMG and renew their practice. The legal profession was nearly always well represented in the Committees of National Liberation and the Sindaci were more often than not lawyers. Most lawyers were keen politicians as well. Shortly after the occupation of an area it was the practice to instruct lawyers to select a committee to ·represent them. The avvocati usually took pride in defending their clients in AMG Summary Courts and

were not afraid to make the best of their legal knowledge, which was usually superior to that of the CAO.

22. Monuments, Fine Arts and Archives

a. For some time no Monuments, Fine Arts and Archives (MFAA) Officer was attached to AMG at Army level, and apart from endeavoring to prevent misuse of churches and other historic buildings by troops, the CAO had no responsibility in this respect. With the attachment of a Specialist MFAA Officer in 1944, the preparation of lists of protected monuments, and of notices to designate them, increased the possibility of guarding against damage. Protection was needed against vandalism by troops and civilians, carelessness arising from ignorance of values, and continued injury from weather to damaged structures.

b. Buildings were considered worthy of protection because of (1) inherent architectural merit, (2) valuable and/or perishable contents, or (3) historical associations. Bridges, fountains, memorials and arches were also important. Later on, attempts were made to preserve parks and ornamental trees and plants. During operations, museums, libraries and archives are especially susceptible to damage. MFAA Officers kept close contact with units and Town Majors to prevent as much damage as possible.

c. On entering a town the CAO posted a notice on each important known monument or church, identifying it and prohibiting removal of damaged or undamaged materiels. He then asked the Town Major to place off limits, for the time being, all museums, galleries and libraries. Finally, he warned unit commanders in occupation of protected buildings of their responsibility. Custodians were provided for many edifices and valuable objects were removed to safe storage.

d. Emergency repairs most needed in the early stages were: (1) recovery and storage of fragments of stone and other decorative elements from debris, (2) emergency bracing of weakened structures, (3) protection of exterior ornaments

572

against traffic damage and (4) temporary repairs of leaking roofs above perishable materiels like frescoes, mosaics, books, and manuscripts. Simple first-aid repairs, if done early, were found better economy than delayed major projects. Such emergency measures were generally arranged by the MFAA Officer with the appropriate civilian authorities, with any necessary pressure applied by the CAO.

23. *Partisans*

a. The story of the Italian partisans may never be more than half told. Every day of the campaign in Central and Northern Italy revealed new tales of German atrocity and partisan bravery.

b. Until the Spring offensive of 1944, partisans were usually encountered in the form of scattered individuals who performed great services to the Allies as guides to patrols in mountainous areas. There were also, however, small bands of partisans whose one aim was generally to free their own commune. They were not part of a central organization. AMG recognized that these men, employed directly or indirectly by the army, had certain rights of movement and weapon carrying.

c. During the advance toward Pisa, Florence and the Gothic Line, the first organized bands and units of the Garibaldi Brigade were met, as well as other bands composed of and/or led by Yugo-Slavs, Russians and even British and American ex-Prisoners-of-War. These Italians were reluctant to give up their arms to the CCRR or the Italian Army, and Allied partisans were unwilling to surrender them to anybody. Finally it was agreed that arms should be handed in for safe-keeping to the CAO who would reissue them in case of necessity, or see that they were dropped further north in enemy-occupied territory. At this time the partisans were often the only armed body between the CAO and the Germans. The principle was adopted of making the band leader responsible for the handing in of arms and for the conduct of his men, as well as for the preparation of lists of bona fide Partisans. The issue of

diplomas for valor in the field, signed by the Supreme Allied Commander, was a natural sequel to this policy. The working of the system depended on the individual leader. Bands of partisans varied from local lads who joined up after the Germans withdrew and were not averse to campaigning against landowners, all the way to well-armed, disciplined and centrally controlled units like the Garibaldi brigade.

d. To assist the CAO, Italian "Patriot" officers were attached to each Corps, and for a time representatives of the central CLN were also attached. Partisans of Allied nationalities were generally sent to camps in Southern Italy in transit to their own country.

e. AMG found it difficult to fulfil many promises made by radio to the Partisans as no adequate supplies of clothing or food were available. There was some disillusionment and political influences came into play. However, welfare committees were formed, and two members of the Giunta Municipale were appointed to find work for ex-Partisans and to help them either through ECA or with voluntary gifts. After this first aid treatment higher representatives came to arrange for pensions and other gratuities. During the winter of 1944-45 large rest and rehabilitation centers were set up where demobilized Partisans could obtain free food and lodging for a month while looking for work. Clothing was provided from Rome. A form of Identity Card certifying that the bearer had been a Partisan was issued. In the Army area, the Partisan and his welfare in the emergency stage were primarily an AMG responsibility.

24. Public Health and Welfare

a. The Army was greatly concerned with the success or failure of the Public Health and Welfare Branch of AMG. A disease-free population in an Army area is a protection to the health of the troops. There were no epidemics in areas controlled by Army AMGs, though one or two out-breaks of typhoid were classed as exaggerated endemics. The Army

did not recognize medical treatment of civilians as its
responsibility, but AMG Public Health officers did their best
to restore the civilian medical services and to supply needed
materiels. Civil hospitals and ambulatories were reorganized.

b. Major problems were the numerous civilian battle
casualties, occupation of civilian hospitals by the military, and
lack of supplies and equipment. In 1944 Public Health Officers
were attached to Corps HQs, for close liaison with the Medical
Branch. Italian Army Field Hospitals were used as mobile
Casualty Clearing Stations for civilians. They were kept as
far forward as possible and their patients were evacuated to
civil hospitals in rear areas. For many months AMG depended
almost wholly on the Armies for ambulances, but ultimately
Ambulance Platoons were formed for AMG use. During static
periods the American Field Service was generous in loaning
ambulances to AMG.

c. Control, diagnosis and treatment of women suffering
from venereal dieseases received special attention. Italian
civilian facilities were inadequate and unreliable and AMG
organized its own mobile VD hospitals staffed by civilians.

d. In the early days of our occupation, medical supplies
were scarce and had to be begged from Army sources, or col-
lected from abandoned German or Italian stocks or from
wrecked pharmacies. Public Health Branch of AMG ultimately
transported its own stocks and made issues from mobile Medi-
cal Supply Depots in the form of "Spearhead Kits," (carried
by CAOs), hospital kits, and bulk supplies. The sale of drugs
through normal civilian channels was resumed as soon as pos-
sible. Fixing of prices and distribution of Medical supplies
through wholesalers and pharmacies was started in Army areas
long before it was tried elsewhere in Italy, but it did not
always work well owing to lack of communications and to other
similar factors.

e. Lunatics were a problem as asylums were few and gener-
ally full. Diseases most frequently met with were: typhoid,
diphtheria, scabies, and malaria. There were some "typhus"

scares caused by the similarity of the Italian names for Typhoid and Typhus.

f. The low standard of medical services in Italy was a constant surprise to AMG. Many civilians preferred Army doctors and dressing stations to their own civilian equivalents. Close supervision of hospital authorities and communal doctors was always necessary.

g. Reorganization of private and public welfare institutions and agencies began in Army areas. ECA was the principal Agency providing relief in cash or kind. It generally had to be reorganized and new officials appointed. In some instances ECA organized communal feeding. Provincial and Communal Refugee Committees were set up but the lack of public spirit in most Italians interfered with their efficiency. Orphanages and homes for old people were found over-crowded, ill-equipped and partially disorganized, but attempts were made to keep them going. Re-organization of the Italian Red Cross was a priority project of AMG Public Welfare; however, transport was scarce and in poor condition, many Fascist officials had to be removed and there was never much support from the general public.

h. In the first few weeks many families became separated and casualties were sometimes removed far from their homes. The British and American Red Cross made every effort to keep contact between patients and their families. A fairly comprenhensive survey of all communal institutions and agencies was undertaken which was of value to the Italian Welfare officials as well as to AMG.

25.   *Public Safety*

a. Public Safety in Army areas is closely related to the safety of the Army itself. This chief purpose of AMG was to relieve the Army of responsibility for civilian affairs and to prevent local disturbances which might hamper operations. Trained Allied policemen were attached to AMG from the start of the Italian campaign. It was originally intended to have a

CAO and a CAPO (Civil Affairs Police Officer) in every large town, but shortage of personnel generally made this impossible. Police officers often carried out the duties of CAOs and even of AMG LOs.

. *b*. Large numbers of CCRR were attached to the Armies to maintain public order. The Senior Civil Affairs Police Officer (SCAPO) at Army HQ was responsible for their clothing, administration and operations. The CCRR rendered great service to AMG. The troops recognized that they represented law and order under AMG control. Before a Province fell to the Allied forces, a nucleus of CCRR was formed to operate in it. They were fed in from base depots in Rome, Florence and Bari and "dropped off" as communes were liberated. Each CAO had three or four mobile CCRR attached to him who followed from town to town, relieving him of many manual duties and also serving to represent the forces of law and order. CCRR personnel found in civilian clothes in any area were sent back to their base depots for screening and refitting, though it was never possible to equip them adequately. Nevertheless they could be relied upon to carry out their duties to the best of their ability.

c. The Royal Guardia di Finanza were the next most important policing force, but they never succeeded in obtaining the privileges which the Allies gave to the CCRR. Many were old soldiers and were sometimes employed as auxiliary police. They were generally used to check black market offences and as customs officials. In some cases they committed offences themselves, and generally were not as reliable as the CCRR.

d. The Pubblica Sicurezza were found in large towns and were a kind of detective force though they were frequently uniformed. They were controlled by the Questura, and usually needed more time for political decontamination than a CAO could spare.

e. Guardia Municipale, or Vigile Urbana, were controlled by the Commune. They were generally well-meaning but rarely intelligent. They were kept on point duty and used for the supervision of markets and for street cleaning.

f. Guardia Forestale were state gamekeepers. They patrolled forests to prevent thefts of wood, charcoal and game. They were neither numerous nor important.

g. The Vigile del Fuoco (Fire Brigades) generally found their equipment carried away or smashed by the Germans. They worked well with the Army Fire Services, however and proved useful.

h. UNPA, Italy's Air Raid Protection Body, had a low standard of efficiency and was not very reliable in air raids. The heads were often politically unsuitable.

i. In incidents involving Italian troops and civilians, AMG reserved its right to try Italian soldiers in Military Courts. The behavior of Italian troops was generally neither better nor worse than that of other soldiers.

j. Conditions in Italian prisons were very poor, but the Italian authorities appeared satisfied with them. AMG laid down standard ration scales for prisoners, but constant vigilance was required to see that they were supplied. In the early months troops had a tendency to throw open all prisons and release their inmates, not only anti-Fascists but often criminals.

k. Law enforcement in the early phases of an advance was seldom found to be a great problem, but it became less easy in static stages when the populace realized that it was finally free again.

l. The issue of permits to circulate beyond stipulated distances or after curfew was an onerous duty of AMG. Officers were ultimately assigned to do almost nothing else, with the assistance of G-2 personnel. Canalization of permits was found important; if more than one AMG officer issued them in a town the civilians would make the rounds of every office before giving up hope. For a long time there was no standard form of pass, but the introduction of a standard AC/AMG "Yellow Pass" decreased the tendency for officers and men of all units to issue "travel chits." AMG were at one time responsible for the issue of travel permits to the Italian Armed Forces but this proved to be impracticable.

m. Travel was restricted with the sole object of maintaining military security and to keep the roads clear for military traffic. Limits in Army areas were normally 10 km but in Divisional areas they might be cut down to 3 km, or less. The value of these restrictions depended on the forces available to carry them out. The task fell almost entirely on AMG until the autumn of 1944 when G-2 assumed the responsibility for maintaining road blocks. Really strict control was possible only on forward areas. AMG looked on the permit system as a necessary evil, though to some extent it helped to limit black market operations.

n. Civilian motor vehicles were not allowed to circulate without AMG permits displayed on the windshield. All civilian vehicles had to be registered before they could be used, and the issue of petrol coupons depended on registration. Permits were issued to photographers to carry on their trade with certain limitations. Fishing permits were issued only with Naval approval. Permits for public assemblies, and permits to carry arms were very rarely issued in the Army areas.

26. *Italian Armed Forces*

a. Three of the most important AC Sub-Commissions set up to deal with problems arising out of the unconditional surrender of Italy in 1943 were the Air Force, Land Force and Navy Sub-Commissions. All three were independent of the four main Sections of AC and all operated mainly on high policy levels and in close and constant co-operation with AFHQ. G-5 Section, 15th Army Group, and AMG, Fifth and Eighth Armies, were not concerned with the operations of the Air Force and Navy sub-Commissions.

b. A branch of the Land Forces Sub-Commission, known as the Military Mission to the Italian Army (MMIA), did maintain liaison officers in Fifth and Eighth Armies to supply them with Italian combat and service troops. AMG had no direct contact with MMIA, though they were both branches of AC.

27. War Materiels Disposal and Prisoners of War

a. The War Materiels Disposal and Prisoners of War Sub-Commission, HQ AC, operated directly with the G-4 and Salvage Branches of the Army in salvaging and disposing of recovered war materiels. AMG in Armies played a minor liaison role in these operations. Some co-ordinating was done by G-5 Section, 15th Army Group.

b. G-5 Section, 15th Army Group, was somewhat more directly involved in the repatriation of Italian Prisoners-of-War released in Northern Italy and in Germany following the break-through into the Po Valley. It acted as a supervising agency and saw that the Displaced Persons and Repatriation Sub-Commission representatives worked with the Armies to facilitate the movement of these people. In Army areas the Armies themselves were responsible for the handling of freed Italian Prisoners of War, but behind 15th Army Group lines they became the sole responsibility of AC. In moving them, especially during the acute stage which followed the collapse and surrender of the German Armies in Italy and south-eastern Austria, both Fifth and Eighth Armies used AMG machinery, coordinated by "Displaced Persons and Refugees" personnel, to facilitate their disposition. G-5, 15th Army Group shipped to Southern Italy by AC transport, thousands of ex-POWs delivered into the rear sections of 15th Army Group area by Army transport.

28. Public Relations

a. AMG Public Relations on 15th Army Group and Army levels was a succession of improvisations from the time the Allies landed in Sicily until well on into 1945. The result was that AMG never had a very good press in the Allied countries and a great deal of fine work done in forward areas never found its way into print. The Branch with which press and radio correspondents had their closest contacts, and from

which they were bound to judge the efficiency of the entire organization, was totally inadequate for the job to be done.

b. Fifth Army AMG had some PR personnel, off and on, until a few weeks after the liberation of Rome, again for some days in the fall of 1944, and then again in 1945, when the SCAO secured a civilian Public Relations agent from PWB. Eighth Army AMG had no PRO at all until May 1944, when one of the Deputy Directors of the Branch moved forward into the field to cover operations until after the City of Florence was handed over from AMG Eighth Army to AMG Fifth Army late in August 1944. In February 1945 a permanent PRO was assigned to AMG Eighth Army. Regions had Public Relations Divisions, some of them quite large and active, until March 1944, when they were all abolished and their staffs dispersed. While they existed they cooperated with Army AMG's.

c. In the fall of 1944 it was realized that both Army AMGs were entitled to coverage, and the Deputy Director (Field) was moved from AMG Eighth Army and attached to Civil Affairs Section, HQ AAI (later G-5 Section, 15th Army Group) to "supervise" field operations. He was, however, given no assistants to enable him to operate effectively.

d. Finally, after the Allied Armies had broken through into the Po Valley and correspondents had begun to pour northward into the newly liberated industrial areas, an AMG PRO was loaned by AC HQ to Fifth Army PR to cover Northwest Italy for both Army and AMG, and an NCO was loaned temporarily to the Deputy Director (Field).

e. Experience in the Italian campaign made it clear that, failing an effective Public Relations Branch at AC/AMG headquarters with adequate staff and facilities to cover the forward areas, AMG PROs should have been under command of Army Public Relations, using Army PR facilities and channels. Close liaison between the Army PROs covering AMG and the PWB combat teams, on questions affecting the Italian press, cinema and radio in Army areas, could have been maintained. A similar arrangement at 15th Army Group HQ would have been workable.